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U. S. NUCLEAR REGULATORY COMMISSION

REGION III

Report Nos. 50-454/90023(DRP); 50-455/90023(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

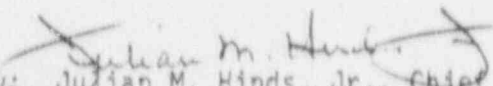
Facility Name: Byron Station, Units 1 and 2

Inspection At: Byron Site, Byron, Illinois

Inspection Conducted: October 3 through November 14, 1990

Inspectors: W. J. Kropp

R. N. Sutphin

Approved By: 
Julian M. Hinds, Jr., Chief
Reactor Projects Section 1A

NOV 28 1990

Date

Inspection Summary

Inspection from October 3 through November 14, 1990 (Report Nos. 50-454/90023(DRP); 50-455/90023(DRP)).

Areas Inspected: Routine, unannounced safety inspection by the resident inspectors of action on previous inspection findings; operational safety, onsite event followup, current material condition, radiological controls, security, licensee event reports, potential significant event, maintenance activities, work planning, surveillance activities, cold weather preparation, and engineering and technical support.

Results: Of the thirteen areas inspected, two violations were identified. One violation pertained to an inoperable train of the AFW system (paragraph 5.b) and the other to refueling activities (paragraph 7). One unresolved item pertaining to apparent lack of documentation for authorization of overtime was identified (paragraph 7). The following is a summary of the licensee's performance during this inspection period.

Plant Operations

The licensee's performance in this area was mixed during this inspection period. Operational activities for the operating unit (Unit 1) was considered good; however, activities associated with the Unit 2 refueling outage were not at a level commensurate with other Byron refueling outages. Specifically, the activities that pertained to moving fuel assemblies in the spent fuel pool and fuel reconstitution were not performed in an effective manner. Also, the licensee's control of overtime was identified as an unresolved item based on the amount of overtime worked by a technical staff individual during fuel assembly placement in the spent fuel pool and the apparent lack of documentation to authorize overtime for a fuel handling foreman.

Safety Assessment/Quality Verification

The licensee's performance in this area was considered good as evident by the quality of the LERs reviewed by the inspectors and the Potentially Significant Event issued for the reactor upper internal's event.

Maintenance and Surveillance

The licensee's performance in this area was overall considered good. Considerable effort has been expended in repairing steam leaks on the secondary side. However, effort still continues on some steam leaks. Material condition of Unit 1 continues to be good which is a reflection of the effectiveness of maintenance activities. One significant event occurred during the inspection period that involved maintenance personnel. The event was that the reactor upper internals were damaged when a maintenance individual instructed the polar crane operator to prematurely lower the upper internals prior to clearing the internals support stand. Another event documented in the previous inspection period as a unresolved item pertained to an inoperable train of auxiliary feedwater for Unit 2 due to a removal of a strut on suction piping. The unresolved item was closed based on the issuance of a Notice of Violation. One of the contributing causes of the event was ineffective work planning controls, specifically shift authorization to commence work on plant systems.

Engineering and Technical Support

The licensee's performance in this area was considered good during this inspection period as evident in the resolution of the fuel assembly, that slipped out of reconstitution basket, that required not only technical support for recovery but also a redesign of the core reload. Also, good engineering and technical support was evident in the resolution of the bent pins on the reactor upper internals.

DETAILS

1. Persons Contacted

Commonwealth Edison Company (CECo)

- *R. Pleniewicz, Station Manager
- *K. Schwartz, Production Superintendent
- R. Ward, Technical Superintendent
- *J. Kudalis, Service Director
- D. Brindle, Operating Engineer, Administration
- T. Didier, Operating Engineer, Unit 0
- T. Gierich, Operating Engineer, Unit 2
- *T. Higgins, Assistant Superintendent, Operating
- J. Schrock, Operating Engineer, Unit 1
- *M. Snow, Regulatory Assurance Supervisor
- *D. St. Clair, Assistant Superintendent, Work Planning
- *P. Johnson, Technical Staff Supervisor
- *T. Tulon, Assistant Superintendent, Maintenance
- *D. Winchester, Quality Assurance Superintendent
- *M. Rauckhorst, PWR Projects Principal Engineer
- *E. Fuerst, Nuclear Operations, Vice President PWR, Operations Staff
- *D. Berg, Quality Programs & Assurance
- *W. Dijstelbergen, Site Engineering Supervisor/NED
- *E. Zittle, Regulatory Assurance Staff

*Denotes those attending the exit interview conducted on November 14, 1990, and at other times throughout the inspection period.

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, and electrical, mechanical and instrument maintenance personnel, and contract security personnel.

2. Action on Previous Inspection Findings (92701 and 92702)

- a. (Closed) Unresolved Item 454/89016-02; 455/89018-01; Design of Hydrogen Monitor suction lines did not agree with the description in the Updated Final Safety Analysis Report (UFSAR). As documented in a letter to NRR dated June 29, 1990, the licensee committed to modify the Hydrogen Monitor suction lines that ensures both containment isolation and hydrogen monitoring system operability in the event an electrical 125V dc engineer safety feature bus was lost following a loss-of-coolant accident.
- b. (Closed) Unresolved Item 455/90019-02(DRP); Review of the work planning and modification process for strut removals on the Auxiliary Feedwater System. This item was closed based on the issuance of a Notice of Violation that is discussed in paragraph 5.b of this report.

- c. (Closed) Unresolved item 455/90019-03(DRP); Three events during refueling activities occurred during the month of September 1990. Subsequent to identifying this issue as unresolved, two more events were identified that pertained to refueling activities. This item was closed based on the issuance of a Notice of Violation that is discussed in paragraph 7 of this report.
- d. (Closed) Open Item 455/90019-04(DRP); Unplanned radiological release on September 7, 1990. The inspectors reviewed the corrective action to this event documented in Deviation Report 2-90-033. The inspectors concluded that the corrective action of radioactivity sampling in the main steam valve rooms during future integrated leak rate tests should preclude similar future unplanned radiological releases.

3. Plant Operations

Unit 1 operated at power levels up to 100% in the load following mode.

Unit 2 has been in a refueling outage since September 1, 1990. The outage was planned for 59 days with a scheduled return to service date of October 30, 1990. However, due to damage to the upper reactor internals, the outage has been extended with a revised scheduled return to service date of November 23, 1990.

a. Operational Safety (71707)

During the inspection period, the inspectors verified that the facility was being operated in conformance with the licenses and regulatory requirements and the licensee's management responsibilities were effectively carried out for safe operation. Verification was based on routine direct observation of activities and equipment performance, tours of the facility, interviews and discussions with licensee personnel, independent verification of safety system status and limiting conditions for operation action requirements (LCOARs), corrective action, and review of facility records.

On a sampling basis the inspectors daily verified proper control room staffing and access, operator behavior, and coordination of plant activities with ongoing control room operations; verified operator adherence with the latest revisions of procedures for ongoing activities; verified operation as required by Technical Specifications (TS); including compliance with LCOARs, with emphasis on engineered safety features (ESF) and ESF electrical alignment and valve positions; monitored instrumentation recorder traces and duplicate channels for abnormalities; verified status of various lit annunciators for operator understanding, off-normal condition, and compensatory actions; examined nuclear instrumentation (NI) and other protection channels for proper operability; reviewed radiation monitors and stack monitors for abnormal conditions; verified that onsite and offsite power was available as required; observed the

frequency of plant/control room visits by the station manager, superintendents, assistant operations superintendent, and other managers; and observed the Safety Parameter Display System (SPDS) for operability. No problems were noted.

b. Onsite Event Follow-up (93702)

1. On September 29, 1990, a Unit 2 spent fuel assembly slipped out of the basket used for fuel reconstitution. For further details see Inspection Report 50-454/90021; 50-455/90019. The licensee took prompt and effective action to this event and obtained good technical support for corrective actions and the redesign of the core load for cycle BY2C3. See paragraphs 6.a of this report for further details.
2. On October 8, 1990, at approximately 6:00 p.m., the Unit 2 reactor upper internals were lifted off a support stand and were in transit to the reactor vessel for placement. The maintenance individual directing the polar crane operator signaled to lower the internals while the internals were still moving toward the vessel. The signal was given prematurely, as approximately 1/4 of the internals were still over the support stand. The licensee fuel handling foreman, Senior Reactor Operator limited (SROL) present during the upper internal attempted placement, was aware of a recent event at another nuclear plant where bent guide pins caused two fuel assemblies to "hang up" when the reactor upper internals were lifted from the core. The fuel handling foreman immediately instructed personnel to place the upper internals on the support stand. The licensee then used a video camera to inspect the upper internals for damaged guide pins on the upper core plate. These guide pins mate with the upper nozzle of the fuel assembly. There are two pins per fuel assembly. For further details see paragraph 6.b of this report.
3. On October 31, 1990, at 1:31 a.m., during the performance of Out-of-Service (OOS) 90-0-4112 to remove the OA Essential Service (SX) make-up pump from service for mechanical maintenance work, fuse FU-05 was removed in panel 1PL05J instead of 1PL04J as specified in the OOS. Fuse FU-05 in 1PL05J supplied control power for the OB SX make-up pump. The Nuclear Station Operator at the control room's center desk immediately noticed the loss of control power when the fuse was mistakenly pulled for the OB SX make-up pump. The fuse was replaced in seven minutes. Until the fuse was replaced for the OB SX make-up pump, Unit 1 was in Technical Specification Action Statement for Limiting Condition for Operation 3.0.3 (7 minutes). The inspectors will review the associated LER for proper root cause determination and corrective action.
4. On November 7, 1990, at 3:47 p.m., the 2A steam generator was being drained for chemistry via the 2A steam generator blowdown lines. At the 10-10 steam generator level the blowdown valves

isolated, which was a result of a modification installed on Unit 2 during the refueling outage. The inspectors will review the associated LER for proper root cause determination and corrective action.

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. The licensee has initiated steps to decrease the number of steam leaks on Unit 1 balance of plant components by the Furmanite process. Overall the material condition for Unit 1 was considered good. Housekeeping was also considered good for Unit 2. The material condition of Unit 2 will be assessed after completion of the refueling outage scheduled for November 23, 1990.

d. Radiological Controls (71707)

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

e. Security (81064)

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 verified that observed personnel and packages entering the protected area were searched by appropriate equipment or by hand.

No violations or deviations were identified.

4. 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) 454/90006-LL: Safety Injection signal that resulted in the closure of instrument air containment isolation valve 2IA065. See Inspection Report 454/90021, 455/90019, paragraph 3.c(3), for further details.

(Closed) 454/90012-LL: The licensee's Nuclear Engineering Department determined that the Auxiliary Feedwater (AFW) discharge header isolation valves 1/2 AF013 (A-D) could not be relied upon to fully close during a main steam line break inside containment accident. See Inspection Report 454/90021; 455/90019 paragraph 6.c, for further details. During the Unit 2 refueling outage, the licensee performed hardware modifications on the 2AF013 valves to resolve the concern. Modification to the Unit 1 AF013 valves were planned for the refueling outage in September 1991. Until then, the appropriate interim emergency procedure changes will remain in effect for Unit 1.

(Closed) 455/90007-LL: During the performance of a technical specification surveillance, the licensee discovered that the intermediate head cold leg injection throttle valve for loop "A" was closed. See Special Inspection Report 455/90022 for further details of this event.

b. Potential Significant Event (PSE)

The inspectors reviewed the PSE issued for the event that resulted in damage to the reactor vessel upper internals on October 8, 1990. The licensee identified the following several factors that contributed to the event:

- * No markings existed on the lifting rig or along the cavity to accurately indicate the height or length of the upper internals storage stand.
- * No quantitative guidance was delineated in the upper internals installation procedure that could have served the same purpose as markings.
- * Instead of lowering the upper internals when dosimetry alarmed, as expected, the job of moving the upper internals should have been stopped and radiation protection personnel contacted as discussed in the As Low As Reasonably Achievable (ALARA) meeting.

- * The individual directing the crane operator did not consult the maintenance or fuel handling foremen prior to lowering the internals.

The PSE identified corrective actions that include revision to the upper internals installation procedure, BMP 3118-5, that include detailed guidance on the path to use between the reactor vessel and the upper internals support stand and quantitative guidance with physical description given to aid in determining if the upper internals are clear of the support stand. The licensee's investigation into the root cause and the subsequent corrective actions documented in the PSE were considered very good.

No violations or deviations were identified.

5. Maintenance/Surveillance (62703 and 61726)

a. Maintenance Activities (62703)

Station maintenance activities that affected the safety related and associated systems and components were observed or reviewed to ascertain compliance with approved procedures, regulatory guides and industry codes or standards, and in conformance with Technical Specifications.

The following items were considered during this review: the limiting conditions for operation were met while components or systems were removed from and restored to service; approvals were obtained prior to initiating the work; activities were accomplished using approved procedures and were inspected as applicable; functional testing and/or calibrations were performed prior to returning components or systems to service; quality control records were maintained; activities were accomplished by qualified personnel; parts and materials used were properly certified; radiological controls were implemented; and fire prevention controls were implemented. Work requests were reviewed to determine the status of outstanding jobs and to assure that priority is assigned to safety related equipment maintenance which may affect system performance.

Portions of the following maintenance activities were observed and reviewed:

- B 79988 Test Air Circuit Breaker, W DS-206, 480V, from cubicle 2312 per procedure 90-2-357 and install in cubicle 132x, 2D, for Fan OVC01CB.
- B 68008 Remove Air Circuit Breaker, 3-pole, 480V volt, W DS-206, and send to Westinghouse for inspection.

The inspectors periodically monitored the licensee's work in progress and verified performance was in accordance with proper procedures, and approved work packages, that 10 CFR 50.59 and other

applicable drawing updates were made and/or planned, and that operator training was conducted in a reasonable period of time.

b. Work Planning

On August 17, 1990, the inspectors identified that a pipe strut had been removed from the Essential Service (SX) suction pipe to the 2A Auxiliary Feedwater (AFW) pump. The shift foreman was unaware that the scope of the work by the contractor included the removal of a pipe strut on the AFW system. The removal of the pipe strut resulted in the 2A AFW pump being inoperable (See LER 455/90005 for details). The failure to declare the 2A AFW pump inoperable and enter the appropriate Action Statement for Technical Specification 3.7.1.2 is considered a Violation. (455/90023-01(DRP)). The inspectors were concerned with the effectiveness of the control of contractors in the area of work planning; specifically, the method utilized for ensuring the operating shift personnel were aware of work activities on plant systems. Subsequent to August 17, 1990, contractor personnel again commenced work activities (on the chemical and volume control system (CV) per NWR B76299) without operating shift personnel being aware of the activities (Deviation Report 90-248). In this instance, operability of the CV system was not affected. Response to the violation should address the licensee's assessment of the controls and methods utilized to authorize maintenance/modification work on plant systems.

c. Surveillance Activities (61726)

The inspectors observed or reviewed surveillance tests required by Technical Specifications during the inspection period and verified that tests were performed in accordance with adequate procedures, test instrumentation was calibrated, limiting conditions for operation were met, removal and restoration of the affected components were accomplished, results conformed with Technical Specifications and procedure requirements and were reviewed by personnel other than the individual directing the test, and any deficiencies identified during the tests were properly reviewed and resolved by appropriate management personnel.

The inspectors witnessed or reviewed documentation for portions of the following activities:

OBOS XFT-A1:	Cold Weather Preparation
1BIS 3.1.1-226:	92 Day Calibration of Nuclear Instrumentation System Power Range N41, N42, N43, and N44
2BVS 8.1.1.2.F-14:	2B Diesel Generator 24 Hour Load Run and Sequencer Test 18 Months

d. Cold Weather Preparations (71714)

The inspectors reviewed the licensee's preparations for cold weather. The licensee has a surveillance, OBOS XFT-A1, "Freezing

Temperature Equipment Protection", that was performed between September and November 1990. The surveillance verified that normal cold weather precautions were in place. Some of systems/components verified for proper cold weather precautions included: Circulating Water Pump House, Reactor Water Storage Tanks, Condensate Storage Tanks, Essential Service Cooling Tower Valve Rooms, and the Security Diesel. Verification activities included thermostat settings, energization of heat trace, heater power energized and anti-freeze in heaters. No problems were noted.

One violation was identified.

6. Engineering & Technical Support (37828)

- a. As a result of the damage to fuel assembly T77K during reconstitution activities, the licensee had to alter the core reload configuration. Fuel Assembly T77K and 7 other symmetrical, twice-burned assemblies were discharged from the planned reload. The licensee selected 8 other twice-burned assemblies, from the previous fuel cycle, for use in the current fuel cycle, BY2C3. An on-site review, and off-site review, was conducted to verify the acceptability of the redesigned fuel load. During the investigation, for the cause of the event, the licensee determined that the lid was not fully closed on the basket. In the not fully closed position the lock plate rotated into the locking position, and the lock screws inserted, however, the lid locking pins were not engaged to prevent the lid from opening. During the informal J-hook lift test the hook inadvertently engaged both the basket lid and the fuel assembly bottom nozzle at the same time, thereby, providing a false indication of the status of the lid. Corrective action included revisions to Westinghouse procedures requiring independent visual confirmation of the lid closing and latching, and checking with the J-hook test; additional detailed checklist guidance, on how to close and secure the lid; enhanced supervision; and additional training. Westinghouse has been requested to review the event for 10 CFR Part 21 applicability and design adequacy. This is being tracked by the licensee as an action item.
- b. On November 3, 1990, the licensee completed repairs to the guide pins on reactor upper internals and reinstalled the upper internals into the reactor vessel. The repairs involved straightening 9 pins, cutting off 6 pins and gauging the pins of 40 other fuel assemblies surrounding the area where the pin damage occurred. The gauging was accomplished with a functionality gauge which verified that the two pins associated with a single fuel assembly would be properly aligned, within the required clearances. Straightened pins were also functionally gauged. The six pins were cut off using the electron discharge machine (EDM) process. All work was inspected visually by underwater cameras prior to final approval. Westinghouse was involved in the analysis and acceptance of the final configuration of the upper internals after the repairs. The inspectors reviewed On-Site Reviews (OSR) 90-258 and 90-260 for straightening and cutting

of the guide pins. Both OSRs were reviewed by the inspectors and appeared technically sound. The licensee's performance in the resolution to the bent pins on the upper internal assembly was considered very good.

No violations or deviations were identified.

7. Refueling and Spent Fuel Pool Activities (60710, 86700)

During the previous inspection period documented in Inspection Reports 454/90021; 455/90019, an Unresolved Item (455/90019-03) was identified that pertained to three events that occurred during the current Unit 2 refueling outage. The inspectors have subsequently reviewed five other events related to refueling activities. Following is a summary of the refueling events that have recently occurred at the station based on these reviews and the previous inspection period.

- * Fuel assemblies placed in the wrong spent fuel rack (SFR) location on January 22, August 22 and September 25, 1990.
- * Fuel rod incorrectly removed from a fuel assembly during fuel reconstitution activities on September 29, 1990.
- * Slippage of a fuel assembly out of the basket used in fuel reconstitution activities on September 29, 1990.
- * Damage that occurred on October 8, 1990, to the reactor upper internals during installation activities after core reload.

The inspectors were concerned with the above recent refueling events. The refueling events that pertained to the reconstruction activities will be reviewed by the inspectors during the closure of LER 455/90008. The activities associated with the fuel assemblies in the wrong SFR location and the bent guide pins on the upper internals were controlled by the following procedures:

- * BAP 370-3, Revision 6, "Administrative Control During Refueling", step c.44 which states that prior to release of a fuel assembly being seated in a spent fuel rack, a cognizant management individual shall independently verify proper location as specified in the PWR Nuclear Component Transfer List.
- * BAP 2000-3, Revision 8, "Safeguard and Controlling Movements of Nuclear Fuel Within a Station", step c.5 which states the Fuel Handling Foreman shall verify correct fuel assembly location after insertion of each fuel assembly into the assigned storage rack by initialing each step of the PWR Nuclear Component Transfer List.
- * BMP 3118-5, Revision 5, "Reactor Vessel Upper Internal Installation", steps f.2.d and f.2.e, which states to slowly raise the rig and upper internals off the storage rack until the rig and internals have cleared the storage stand and guide studs; and to move the rig and upper internals over the reactor vessel.

The failure to perform recent refueling activities in accordance with the appropriate procedure as evident by placing fuel assemblies in the wrong location in the SFR and the damage to the upper internals described above is considered a Violation of 10 CFR 50, Appendix B, Criterion V (455/90023-02(DRP)). The licensee has initiated corrective action in the area of fuel handling. On October 31, 1990, the licensee's Corporate PWR Organization established a Fuel Handling Task Force (FHTF) to identify the various problems experienced at PWR plants in the area of fuel handling and to provide solutions for those problems. On November 9, 1990, the Byron Station provided the FHTF with a list of Byron's fuel handling-related problems/topics.

During the review of the above refueling events, the inspectors requested the overtime worked for several individuals and identified two concerns. One concern pertained to the control of overtime worked by technical staff personnel. The technical staff individual that was responsible to verify the proper location of the fuel assembly which was placed in the wrong location in the spent fuel rack on September 25, 1990, had worked 29 hours in a 48 hour period and approximately 102 hours in a 7 day period at the time of the event. The individual was not governed by the requirements of procedure BAP 100-7, Revision 4, "Overtime Guidelines for Personnel That Perform Safety Related Functions" at the time, of the event on September 25, 1990. However, due to an event at the licensee's Braidwood Station in October 1990, the Technical Superintendent verbally instructed the technical staff supervisor to comply with the requirements of BAP 100-7. The other concern pertained to the fuel handling foreman (FHF) that was not directly involved in the misplaced fuel assembly on September 25, 1990, but was in the refueling cavity area monitoring core off-load activities as the SROL. A review of hours worked by the FHF determined that the FHF had worked 82.5 hours (including shift turnover) in a 7 day period (September 20-26, 1990). As of November 13, 1990, the licensee could not provide to the residents an Overtime Deviation Authorization for the FHF, as required by procedure BAP 100-7 for individuals that work more than 72 hours in a 7 day period, excluding shift turnover. The matter of documenting overtime authorization of the fuel handling foreman is considered an Unresolved Item pending further review by the NRC (455/90023-03(DRP)).

One Violation was identified.

8. Unresolved Items

Unresolved items are matters about which more information is required in order to ascertain whether they are acceptable items, violations, or deviations. An Unresolved item disclosed during the inspection is discussed in Paragraph 7.

9. Meetings and Other Activities

a. Management Meetings (30702)

On October 19, 1990, Mr. Wayne Shafer, Chief, Reactor Projects

Branch 1, toured the Byron plant and met with licensee management to discuss plant performance and plant material condition.

b. 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 November 14, 1990. 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.