



Commonwealth Edison  
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 Downers Grove, Illinois 60515

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December 31, 1990

Mr. A. Bert Davis  
 Regional Administrator  
 U. S. Nuclear Regulatory Commission  
 Region III  
 799 Roosevelt Road  
 Glen Ellyn, IL 60137

Subject: Byron Station Units 1 and 2  
 Reply to Notice of Violation  
 Inspection Report Nos. 50-454/90023 & 50-455/90023  
NRC Docket Nos. 50-454 and 50-455

Reference: a) November 29, 1990 letter from W.D. Shafer to  
 to Cordell Reed transmitting the results of a  
 Routine Safety Inspection at Byron Station

Dear Mr. Davis:

The referenced letter transmitted Inspection Report 50-454/90023;  
 50-455/90023 containing two Level IV Notices of Violation and indicated  
 certain activities at Byron Station appeared to be in violation of NRC  
 requirements. The Commonwealth Edison Company response to the Notices of  
 Violation (50-455/90023-01) and (50-455/90023-02) are contained in Attachments  
 A and B, respectively.

If you have any questions regarding this response, please direct them  
 to this office.

Very truly yours,

T.J. Kovach  
 Nuclear Licensing Manager

Attachments

cc: NRC Resident Inspector-Byron  
 NRC Document Control Desk  
 A. Hsia-NRR  
 W. Shafer-RIII  
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## ATTACHMENT A

### Violation (455/90023-01)

Technical Specification 3.7.1.2 requires at least two independent steam generator auxiliary feedwater pumps and associated flow paths operable in Mode 1. With one auxiliary feedwater pump inoperable, the Technical Specification action statement for 3.7.1.2 required the auxiliary feedwater pump to be in an operable status within 72 hours or be in at least hot standby within the next 6 hours and in hot shutdown within the following 6 hours.

Contrary to the above, the licensee failed to declare the 2A Auxiliary Feedwater (AF) pump inoperable and enter the appropriate Technical Specification action statement on August 8, 1990, when two pipe struts were removed on the essential service water suction piping for pre-outage modification work that rendered the 2A AFW pump inoperable. At the time of the pipe support removals, Unit 2 was in Mode 1 at 49% reactor power.

### Correction Actions Taken and the Results Achieved

When the Station Control Room Engineer (SCRE) was notified that work had been performed on the system, the pump was immediately declared inoperable pending a review of the work completed to date. LCOAR 2BOS 4.10-1a was entered at 1500 on 8-17-90. Two support systems were modified in conjunction with modification M6-2-88-060 which changed the essential service water suction piping to the 2A AFW pump. 2BVS 4.10-6.2, "Post Maintenance Visual Examination (VT3/4) of Safety Related Component Supports", was satisfactorily completed for both supports and reviewed at 1837 on 8-17-90. Construction Quality Control verified installation and performed dimensional inspections on the supports after the work was completed. An Engineering Evaluation and 10CFR50.59 Safety Evaluation determined that the current condition of the revised supports did not adversely affect operability since the changes increased the load carrying capacity to the supports and did not impose any loads not previously considered. An On-Site Review concluded that both the AF and essential service water (SX) systems were operable and the LCOAR was exited at 2010 on 8-17-90.

Subsequently, Engineering and Construction (ENC) began calculations to determine operability of the system while these two supports were being modified. To verify assumptions made in the calculations which were yielding suspect results, a walkdown was performed of the equipment. On 8-23-90 at 1420, it was discovered that the scaffolding that had been erected on 8-6-90 was being supported from safety related line 2AF03AA-6" and two pipe supports (2PSL-AF051-H89E-3 and 2PSL-AF051-H89E-4). The scaffolding was immediately removed. At 1500, the load bearing nuts on component support M-2AF03021R were found loose. LCOAR 2BOS 4.10-1a was entered. The support was promptly tightened and tested via NWR B78922. The LCOAR was exited at 2138 on 8-23-90.

On August 30, 1990, the results of the ENC evaluation of the support installation sequence and scaffolding loads were received. The results indicated that the normal operating loads were within code allowable values. However, code allowable values were exceeded for design basis load combinations (seismic) during the time supports M-2AF03021R and M-2AF03019R were individually removed.

ATTACHMENT A  
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In addition, immediately following the event a review was made of the B2R02 pre-outage planning efforts. The review revealed the following planning activities were in place prior to the event:

1. Monthly Modification Status Meetings discussing status, scope, work groups involved, and possible installation obstacles.
2. Outage Planning Meetings specific to the Unit 2 second refuel outage (B2R02) discussing all aspects of the outage starting 6 months prior to the planned outage start.
3. A meeting was held prior to the B2R02 Outage to specifically discuss possible pre-outage work. This meeting was attended by ENC, Operating, Maintenance Staff, and Work Planning. Possible pre-outage work was reviewed, and dispositioned as: Pre-Outage, Partial Pre-Outage, or Outage, based on possible impact to plant operations.
4. Pre-Outage activities were discussed in the daily and weekly work planning meeting. The daily meeting discussed work covering the next 3 days, and the weekly meeting covered the next 2 weeks. An Operating Engineer, and the Operations Work Scheduler (SRO) attend both these meetings to review upcoming planned work for possible plant impact.
5. An Informal Daily Construction Work Authorization sheet was in place, which required job information to obtain Shift Authorization to Start Work.
6. Nuclear Operations Directive NOD TS.5 and ENC procedure QE-6 specify that modification packages be categorized as requiring an outage or not requiring an outage. This modification work was categorized as requiring an outage, however practice has been to review outage modifications for individual tasks that may be performed pre-outage. The review is performed at the station.

Through a detailed review of the planning efforts already in place it was determined that some enhancements could be made. The following actions were implemented directly following the event to implement these enhancements.

1. The Informal Daily Construction Work Authorization Sheet was enhanced and formalized on August 20, 1990 for use with the remaining Unit 2 Outage Modification Work Packages. The sheet requires completing a Daily Work Description Sheet which provides more detailed information to the Shift Engineer concerning the scope and requirements necessary to perform the work. This sheet in conjunction with a copy of the Nuclear Work Request (NWR), and the Road Map Traveler, allows the Shift Engineer to address operability concerns.
2. The Maintenance Modification Contractor's Scaffold Procedure (JVSCAF-1) was revised to include a requirement that Operating perform a pre-job review and sign final authorization for scaffold use.

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3. The Station's "Post Maintenance Checklist" procedure (BAP 1600-T11) was revised on September 17, 1990 to require Maintenance to indicate if any scaffold was left in the field after job completion, and for Operating to verify that there are no scaffold related operability concerns prior to declaring equipment operable.
4. An Awareness Day meeting was held on August 24, 1990, with representatives from Maintenance/Modification Contractor (Pope), ENC, and the Station. Items discussed included the Station's approach to maintenance activities, operability concerns, safety, engineering interaction, and the need for enhanced communications with the Operating Department.
5. Construction work activities in progress on August 25, 1990, were inspected by a team consisting of representatives from ENC, Pope, and Station Management. The team had a current copy of the Pope Scaffold Log Book and used it to identify, inspect, and re-tag all existing Pope scaffold with the revised scaffold inspection tags. A copy of the revised tag was given to the Shift Engineer. All unsatisfactory items identified during the inspection were corrected.

These corrective actions were effective in preventing any additional operability concerns relating to pre-outage or outage maintenance or modifications activities for the B2R02 refuel outage.

Corrective Action to Avoid Further Violations:

The following long term corrective actions are being implemented as a result of meetings held between Station Maintenance, Operations, Work Planning, Tech Staff, and Engineering and Construction - Nuclear Operation. During this meeting it was determined that although considerable "big-picture" pre-outage work planning was done well in advance of the outage, the complexity of modification work packages demands more detailed planning.

To effectively develop modification work packages that take into account all aspects of plant operation and reliability it was decided that more up-front involvement in the work package development by Operations and Tech Staff was needed.

Participants at the meeting also noted that construction work in the plant without proper Operations oversight is more likely with outage related modifications, similar operational concerns could be present with non-outage Modifications as well. To avoid a further violation in this area during both outage and non-outage periods the following long term corrective actions will be taken:



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1. For Modification work packages the work analyst, with input from both Tech Staff and a licensed Operations person and ENC person as appropriate, will write a summary of installation steps, including any operational steps i.e. take equipment Out-of-Service, enter LCOAR, etc. The level of detail contained in the summary will be sufficient to address operational and reliability concerns. This summary will generally be done prior to detailed work package development. The installation summary will be approved by an SRO and Tech Staff. A copy of the Modification installation summary will be forwarded to the Shift Engineer for use when authorizing work. BAP 1600-1 will be revised to include this requirement.
2. Modification work packages which have Pre Out-of-Service/LCOAR work will be broken down into sub-packages clearly delineating Pre Out-of-Service/LCOAR work from Post Out-of-Service/LCOAR work. BAP 1600-1 will be revised to include this requirement.
3. Modification work packages will be reviewed and approved by an Operating Engineer or designee. The Operating Engineer will assure that Pre Out-of-Service/LCOAR work is clearly defined and segregated. In addition the Operating Engineer may at his discretion insert "Operating Hold Points" or request that work steps be added to the Road Map Traveler (step by step work instructions) to require operating concurrence prior to work proceeding. BAP 1600-1 will be revised to include this requirement.
4. Modification Work Packages which have Pre Out-of-Service/LCOAR work will be scheduled and statused on the routine or outage work schedule (as applicable) on a sub-package level. BAP 1750-4 will be revised to include this requirement.

Date Full Compliance will be Achieved:

Compliance with Technical Specification LCO 3.7.1.2 was achieved on August 17, 1990. Actions to prevent recurrence will be completed by June 1, 1991.

AIRS: 455-225-90-29; 455-225-90-300; 455-225-90-301; 455-225-90-302.

## ATTACHMENT B

### Violation (455/90023-02)

10CFR50, Appendix B, Criterion V, as implemented by Commonwealth Edison's Quality Requirement 5.0, states that activities affecting quality shall be prescribed by documented instructions and procedures of a type appropriate to the circumstances and shall be accomplished in accordance with these instructions and procedures.

BAP 370.3, Revision 6, "Administrative Control During Refueling", step C.44, 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, 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.

A. Contrary to procedures BAP 370-3 and BAP 2000-3, fuel assemblies were placed in the wrong spent fuel rack location on January 22, August 22, and September 25, 1990.

BMP 3118-5, Revision 5, "Reactor Vessel Upper Internal Installation", Steps f.2.d and f.2.e, 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. Move the rig and upper internals over the reactor vessel.

B. Contrary to procedure BMP 3118-5, the Unit 2 upper internals were not kept adequately clear of the storage rack while moving the upper internals to the reactor vessel. As a result, several guide pins were bent that have to be straightened or cut off prior to inserting the upper internals in the reactor vessel.

#### A.1 Corrective Actions Taken and Results Achieved

On January 22, 1990, the Fuel Handling and Technical Staff personnel were performing fuel shuffle operations in the spent fuel pit. Activity was halted when a discrepancy was discovered with an assembly which was previously positioned in the wrong rack location. A review of the Tag Board and the Nuclear Component Transfer List (NCTL) showed that location B-D5 should have had an assembly in it and did not. Observation with an underwater camera verified that the assembly in location C-D5 was, in fact, the assembly (D21E) which should have been located in B-D5. A variation to the NCTL was written to track the location of this assembly. A second variation was written to place assembly D75F into location B-D5. Execution of the NCTL was then continued.

ATTACHMENT B  
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Corrective action for the January 25, 1990, event was to revise BAP 370-3, Administrative Control During Refueling, to include the following:

- a. Independent verification of fuel assembly location.
- b. Orientation training for non-Fuel Handling personnel.
- c. Required completion of a step on the NCTL prior to turnover.
- d. Placards were placed on the spent fuel storage racks as aids for identifying correct locations.

On September 25, 1990, fuel movements were suspended and an investigation was conducted when fuel handling and technical staff personnel noted a fuel assembly in the wrong location. The investigation revealed that assembly S61J was placed in the wrong spent fuel storage rack location. A Nuclear Component Transfer List (NCTL) variation was initiated to place assembly S61J into the correct location (D-E03) and allow assembly T63K to be placed into location D-D03.

On October 9, 1990, a third error concerning mispositioned fuel assemblies in the spent fuel pit was discovered following the completion of core reload for Unit 2 Cycle 3 operation. The date of this occurrence was August 22, 1990. The Spent Fuel Pool verification showed that fuel assembly C45 was incorrectly located at spent fuel rack Q location K14. The records and tag boards showed that fuel assembly C45 should have been at spent fuel rack Q location K04. The fuel assembly had been moved from spent fuel rack G location J14 on August 22, 1990 during a series of movements to reorganize the fuel assemblies in the spent fuel pool prior to the refueling outage. A Nuclear Component Transfer List variation was initiated to place assembly C45 into the correct location.

The spent fuel racks consist of two different designs. Region 1 racks have greater boral neutron absorbing thickness and greater spacing than Region 2 racks. In each situation, although the fuel assemblies were loaded into the wrong cell location within a rack, they were loaded into a similar regional location. All three instances of misplaced fuel assemblies were reviewed. None of the three misplacements resulted in adverse safety consequences since they were bounded by existing FSAR analyses. All "as found" locations would have been acceptable if they had been specified in the NCTL.

Short term corrective actions for the August 22nd and September 25th events involved conducting "Tailgate" sessions with Fuel Handling Department personnel to inform them of the seriousness of mis-positioned assembly incidents. These sessions included discussions on the potential for reduction of shutdown margin in the pool if an assembly was mistakenly placed into a Region 2 rack without having met the minimum burnup requirements as specified in the Station Technical Specifications. These tailgate sessions also included training on the proper communication techniques and the use of repeat backs when making assembly moves from one location to another.

Excessive use of overtime was determined to be a contributing cause for September 25, 1990 event. As a result, Technical Staff personnel have instituted administrative controls to ensure that the overtime worked by personnel is more rigorously controlled. The overtime worked by fuel handling personnel is presently addressed by an Administrative procedure.

ATTACHMENT B  
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A.2 Corrective Actions to Avoid Further Violation

The events identified in this violation involved the use of the new high density storage racks which were installed in 1989 prior to the Byron Unit One third refueling outage. These high density racks have a smaller pitch and have varying dimensions, which results in a non-optimal indexing system that is relied upon for correct assembly placement.

Corporate and Station management personnel have formed a Task Force to review fuel handling equipment, policies and procedures for the Byron, Braidwood and Zion Stations. This task force has been charged with the investigation of using a crane system or a crane indexing system similar to the one used for core loading. In addition, the Task Force is expected to recommend that an independent human factors review be conducted to determine if the layout and indexing of the spent fuel pool racks can be enhanced.

A.3 Dates When Full Compliance will be Achieved

Fuel Assembly locations were reconciled with the the NCTL by October 9, 1990.

The Task Force investigation is expected to be completed by 4-1-91.

A schedule will be developed shortly thereafter to effect the task force recommendations AIR 455-225-90-30300.



ATTACHMENT B  
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B.1 Corrective Actions Taken and the Results Achieved

The Fuel Handling Foreman present October 8, 1990, during the movement of the upper internals noted an abnormality and immediately instructed the personnel to place the upper internals on the support stand. An investigation was conducted using a video camera to inspect the guide pins for damage. The damage found required the straightening of 9 pins, cutting off 6 pins and gauging 16 pins surrounding the damaged area. The repairs were completed on November 3, 1990.

B.2 Corrective Action to Avoid Further Violation

a. BMP 3118-5 has been revised to:

- Provide a caution on the adverse consequences of bending pins.
- provide a caution to return internals to the storage stand for inspection if damage is suspected.
- provide detailed guidance on the path to use between the reactor vessel and the stand (the guidance prevents intermediate lowering).
- provide quantitative guidance with physical description to aid in determining if the internals are clear of the stand by referencing cavity level and flange height.
- ensure sound powered communications are made available in case conditions are such that hand signals and verbal communications are hindered.

b. Radiation Protection will evaluate the correct setting for the digital alarms while moving the upper internals to and from the reactor vessel.

c. Procedures will be reviewed and revised as necessary to ensure (1) ALARA briefings are more prescriptive and detailed when performing tasks which involve potential high dose concerns and (2) appropriate actions are taken in the event a high dose alarm is received when moving the upper internals.

d. Additional training will be provided on digital dosimetry to ensure adequate understanding of the alarm setpoints and required response.

e. Technical Staff will further investigate a modification and/or procedure changes to provide enhanced quantitative indication for the height of the internals.

f. The corrective actions for the alignment pins have been analyzed for only 1 cycle of operation. Disposition of the damaged alignment pins will be completed by 3-31-92.

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- g. All maintenance personnel were briefed at department safety meetings and at a station stand-down on the events leading to the upper internals alignment pin damage and the importance of the alignment pins. They were also briefed on the event at Indian point and its similarity to our own.

B.3 Dates When Full Compliance will be Achieved

- a. BMP 3118-5 has been revised.
- b. The evaluation for setting the digital alarms is expected to be completed 6-1-91. AIR 455-225-90-265
- c. Procedures will be revised by 6-1-91. AIR 455-225-90-264
- d. Training will be completed by 7-1-91. AIR 455-225-90-266
- e. The Technical Staff investigation to determine a quantitative indication for the internals height will be completed by 3-31-92. AIR 455-225-90-263
- f. The damaged pins will be dispositioned and/or replaced by 3-31-92. AIRS 455-225-90-246, 455-225-90-261
- g. The briefings are complete.