

U.S. NUCLEAR REGULATORY COMMISSION

REGION III

Report Nos. 50-454/90025(DRS); 50-455/90025(DRS)

Docket Nos. 50-454; 50-455

Licenses No. NPF-37; NPF-66

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

Facility Name: Byron Nuclear Power Station, Units 1 and 2

Inspection At: Byron, IL 61010-9750

Inspection Conducted: December 10-14, 1990, and
January 8-11, 1991

Inspectors: *G. M. Nejjfelt* 02-14-91
G. M. Nejjfelt Date
R. A. Langstaff 02-14-91
R. A. Langstaff Date
Approved by: *M. P. Phillips* 2/15/91
M. P. Phillips, Chief Date
Operations Branch

Inspection Summary

Inspection on December 10-14, 1990, and January 8-11, 1991
(Reports No. 50-454/90025(DRS) and 50-455/90025(DRS)).

Areas Inspected: Routine, announced inspection of design changes and modifications; and followup of corrective action taken for violations previously-identified concerning design changes. This inspection was conducted in accordance with Inspection Module 37700.

Results: One unresolved item (URI) was identified concerning the pneumatic pressure test performed and selection of code requirements applied for a minor modification pressure test (Paragraph 3.b(2)). The violations and open item identified in the previous modification inspection team reports, 50-454/89009(DRS) and 50-455/89006(DRS), are closed (Paragraphs 2.a through 2.g). No new open items, violations, or deviations were identified.

Overall, the major/minor modifications and temporary alterations that were reviewed were adequately performed (Paragraphs 3.a, 3.b, and 3.c respectively).

Areas of noted strengths were:

- Modification safety evaluations that were performed by the corporate engineering staff were particularly well supported (Paragraph 4).
- Sharing of experience between Byron, and Byron's sister plant, Braidwood, was evident (Paragraph 5).
- The on-site Quality Assurance Group was actively involved in self-initiated corrective actions for the modification process (Paragraph 6). This area was previously noted as a strength in the previous modification inspection team report, 50-454/89009(DRS) and 50-455/89006(DRS).

DETAILS

1. Persons Contacted

Commonwealth Edison Company (CECo)

J. P. Barrett, Radiation Protection Supervisor
D. Berg, On-site Nuclear Safety Staff
D. Brindle, Regulatory Assurance Supervisor
G. Contrady, PWR Project Engineer/Byron
P. Johnson, Technical Staff Supervisor
P. S. O'Neil, Assistant Technical Staff Supervisor
M. Page, Technical Staff Modification Coordinator
T. Schuster, Nuclear Licensing Administrator
G. K. Schwartz, Production Superintendent
R. C. Ward, Technical Superintendent
E. Zittle, Regulatory Assurance Staff

All personnel listed above attended the exit interview held on January 11, 1991.

Other members of the plant staff (e.g., engineering, quality assurance, licensing, etc.) were also contacted during the inspection period.

2. Licensee Action On Previous Inspection Findings

- a. (CLOSED) Violation 455/89006-01A(DRS): The installing organization, Engineering and Construction (ENC), downgraded work for Steam Dump System Modification M6-2-88-004 from safety related to non-safety related without prior engineering approval. The proper installation was verified by a walkdown of the system and successful post-modification testing. Training to preclude similar problems was completed on May 11, 1989, for ENC and on June 30, 1989, for the corporate engineering staff. This item is considered closed.

- b. (CLOSED) Violations 454/89009-01(DRS) and 455/89006-01B(DRS): Design calculation, CQD 220559, was incomplete in that it failed to consider 16 valves in the safety related nitrogen charging pressure/test manifold as seismically qualified. This design calculation was recalculated to include these 16 valves. This item is considered closed.

- c. (CLOSED) Violation 455/89006-01C(DRS): Periodic cleaning of relay contacts installed for Diesel Generator Modification M6-2-87-166 were not incorporated into the preventive maintenance program. The HFA151 Agastat relays installed with this modification were re-inspected and found by the licensee to be in good working condition. A random sample taken by the facility (e.g., approximately 25%) of other modifications accomplished in the same timeframe as this modification found no similar problem. The periodic vendor maintenance recommendations were incorporated into surveillance procedure, 1/2 BVS DG-1, on December 1, 1989. This item is considered closed.
- d. (CLOSED) Violation 455/89006-02(DRS): Post-modification test for the installation of a time delay logic to prevent prematurely tripping the motor driven auxiliary feedwater pump (AFWP) immediately following a pump start, Modification M6-2-87-132, was cited for not confirming the acceptance criteria in that a low pressure trip signal was established in the time delay logic circuit before a pump start signal. Regional NRC Response Letter of August 19, 1989, reclassified this violation as a Severity Level 5 Violation with no response required. This item is considered closed.
- e. (CLOSED) Violation 455/89006-04A(DRS): Safety evaluation for P-8 Permissive Logic (e.g., no reactor trip for turbine trip if less than 35% power) for Modification M6-2-88-004 did not provide the basis to conclude that an unreviewed safety question did not exist. The facility performed another review of this minor modification, which changed specific electrical contact points utilized. The reevaluation supported the initial conclusion that no unreviewed safety question existed. No unreviewed safety questions were found for 30 modifications reviewed by the facility in the for this modification (i.e., 1987 and 1988). Furthermore, no unreviewed safety questions were identified during this inspection. This item is considered closed.
- f. (CLOSED) Violations 454/89009-03(DRS) and 455/89006-04B(DRS): Several temporary alterations (e.g., 88-1-008, 88-0-009, 88-0-019, and 88-0-035) did not provide justification why each change did not constitute an unreviewed safety question. The temporary alterations that were identified were again reviewed with additional information incorporated. In the re-analysis, no unreviewed safety question existed. Training of the Byron Station Technical Staff was completed in May 1989 to ensure adequate understanding of requirements for a

10 CFR 50.59 safety evaluation. Although discrepancies were noted in several of the safety evaluations performed for temporary alterations, the conclusions were still valid. Therefore, this item is considered closed.

- g. (CLOSED) Open Item 454/89009-02(DRS) and 455/89006-03(DRS): The concerns for this open item were the (1) adequacy of post-modification operability testing; and (2) correlation between engineering checklist requirements and actual test results. One instance was found during this inspection that potentially could be considered inadequate post-modification testing (See URI 455/90025-01(DRS) in Paragraph 3.b(2)). This item is being closed, as the issue of post-modification testing is addressed in the current URI.
- h. (OPEN) Open Item (454/89011-01; 455/89013-01): This item, procedural revisions to emergency operating procedures (EOP), remained open because the approved revisions were not available at the end of this inspection on January 11, 1991. The licensee expected to have these EOP revisions approved by the on-site review committee no later than its commitment date of January 12, 1991.

3. Design Changes and Modifications (37700)

In each of the following major modifications, minor modifications, and temporary alterations, the Inspector reviewed the modification design, 10 CFR 50.59 safety analysis, post-modification testing, supporting procedures, and performed a field verification. Unless otherwise noted, the inspectors determined that the modifications had been conducted in accordance with programmatic and regulatory requirements and that all technical issues had been adequately addressed. The inspectors also determined that no unreviewed safety questions existed for the modifications reviewed.

a. Major Modifications

(1) M6-1-88-023, Auxiliary Feed Pump Engine Lube Oil Pressure Switch Relocation

This modification relocated the lube oil pressure switches for the diesel driven auxiliary feed pump for Unit-1 to prevent spurious pump trips caused by excessive air in the oil line. The pressure switches were relocated closer to the tap off point and lowered in elevation to limit the amount of air possible in the line. A similar modification was performed on Unit-2. The Unit-2 installation of the pressure switches and line were also inspected.

(2) M6-1-88-060, Service Water Flush Line Installation

This modification added a flushing line from the service water A train, near the 1A auxiliary motor driven feed pump suction, to the service water B train return header. Substantial microbiological corrosion and silt build up had been experienced in the service line upstream of the feed pump suction due to lack of flow through the pipe. This modification allowed flushing of the normally stagnant suction line with treated water. When not in use, the flushing line was isolated by two locked closed gate valves.

(3) M6-2-85-032, Primary Sampling Containment Isolation Valves Replacement

This modification replaced the containment isolation valves for the primary sampling system in unit 2. The previously installed valves had through leakage problems. The replacement valves were similar to those previously installed except they were a 1" size instead of a 3/8" size. A similar modification was performed for unit 1.

(4) M6-2-86-010, ATWS Mitigation System (AMS) Installation

This modification added the Anticipated Transient Without Scram (ATWS) Mitigation System (AMS) required by 10 CFR 50.62 to provide an independent backup system for the Reactor Protection System (RPS). AMS was designed to trip the main turbine and in the initiate auxiliary feedwater, if three out of four steam generator (S/G) levels were 3% below the low low level RPS setpoint with both turbine impulse pressure (TIP) channels indicating

power above 30% (e.g., conditions indicative of an ATWS). The AMS utilized existing isolated inputs from the steam generator level and turbine impulse pressure loops which were fed into bistables and logic contained in an added logic cabinet (2PA54J).

The AMS installation was verified to be done in accordance with the guidance of Generic Letter 85-06 that imposed requirements on non-safety ATWS equipment similar to the requirements for safety related (e.g., 100% post installation inspection of safety and non-safety cable terminations within 2PA54J).

During the walkdown for the AMS Cabinet on December 12, 1990, loose screws were found above the power supply (3 screws) and on the floor (3 screws) in the logic cabinet. These screws were immediately removed by the facility staff. No other debris was observed in other control cabinets opened.

Licensed operator training for the AMS was accomplished by "Byron Operations Required Reading, Package 90-8," issued February 15, 1990. Byron Initial License Training Systems Lesson for Auxiliary Feedwater, Chapter 26, was revised and initially presented to students on December 10, 1990.

The Unit-2 ATWS Modification was identical to the Unit-1 ATWS Modification with one exception: the bistable setting "3% below Low 2 level" on Unit-2 was equal to 14%. This was because of the differences between the D4 and D5 steam generator designs for the level taps used in Unit-1 and Unit-2 respectively.

The inspectors noted that the supporting checklists were completed and signed with appropriate quality control participation throughout this modification package.

The mod approval letter for Modification No. M-6-86-010 specified that all cable terminations (safety and non-safety related) in panel 2PA54J were to be 100% post installation inspected. However, the checklists for the non-safety related cables had the quality control (QC) inspection portion marked as N/A. These checklists were revised following a discussion with the Pope Quality Assurance (QA) Manager to require the QC

inspections. A similar occurrence had been identified by the licensee in Finding 1 of quality assurance audit 06-10-12.

b. Minor Modifications

(1) M6-1-90-616, Diesel Generator Overspeed Trip Butterfly Valve Linkage Removal

The linkages for resetting the diesel generator butterfly valves following a diesel generator overspeed trip on the intake of the turbocharger inlets, 1-DG-5254-A and -B, were removed. This remote reset was not used, since these valves were reset locally per procedure.

The initial 10 CFR 50.59 Safety Evaluation for this minor modification incorrectly referenced Equipment Nos. 1-DG-5001-A and -B, which were the discharges for motor driven lubrication oil pumps respectively on the 1A and 1B diesel generator.

(2) M6-2-89-652, Hydrogen Gas Totalizer Replacement

The hydrogen totalizer, 2-FQI-HY024, used to measure the amount of hydrogen gas from bulk hydrogen storage to the main generator, was replaced by a model with a higher working pressure (American Meter Model #2MCVM); and a filter was added immediately upstream of the new totalizer.

The inspectors found that:

- (a) Dual editions of the ANSI Standard Code for Pressure Piping (ANSI B31.1 - 1973 and ANSI B31.1 - 1977) were allowed to be arbitrarily chosen by Sargent & Lundy per Procedure 303.2 for testing Class D piping (procedure file no. "F-2739, L-2739, Amd. 10, 10-31-86).

At the time of the exit, the facility was in the effort of obtaining the rationale for allowing dual editions of a code to be the effort of obtaining the rationale for allowing dual editions of a code to be concurrently applicable (e.g., basis of Sargent & Lundy Procedure 303.2 changed by Amendment No. 7).

- (b) The pneumatic test pressure to verify the integrity of the Unit-2 Hydrogen Totalizer

from the site hydrogen storage tank was performed at 125 psig. Using ANSI B31.1 - 1977, the test pressure of 125 psig was correct; however, no indication was made in the modification package that this pressure was held for a minimum of 10 minutes. Using ANSI B31.1 - 1973, the minimum test pressure required would have been 150 psig.

- (c) Procedures for the hydrogen tank farm operation (e.g., BOP-HY-1, Revision 51; and BOP-HY-3, Revision 51) were obsolete in that no surveillance support was provided for automatic features relied upon (e.g., calibrated flow restriction; and changing hydrogen source as pressure drops). Also, Procedure BOP-HY-2, Revision 4, was obsolete, because the hydrogen source specified by the procedure contained excessive amounts of moisture.

Items 3.b(2)(a) and 3.b(2)(b) are considered an Unresolved Item (URI), 50-455/90025-01(DRS), pending the facility response in addressing the following concerns:

- How are post modification test criteria verified to be correct; and
- What is the justification for accepting the Unit-2 Hydrogen Totalizer pneumatic test that is described in paragraph 3.b(2)(b) as acceptable?

(3) M6-2-90-649, Main Turbine Runback Push Button Indication Rewiring

The turbine runback push button indication circuit was separated from the actual runback signal for the Digital Electrohydraulic (DEH) Computer, as per the vendor recommendation, DCR No. 90-388.

(4) M6-2-90-699, Motor Operated Valve (MOV) Operator Gear Ratio Change

This modification replaced the gears in the operator for the charging pump ECCS discharge valves to increase the operator torque. As part of the review required by Generic Letter 89-10, these valves were identified as having marginal ability to open against the maximum differential pressure

expected. Although the opening times of the valves were increased, the opening times were within bounds used for the plant safety analyses.

Portions of the modification safety evaluation referred to a "hold" pending further research of the plant safety analyses regarding valve opening times. Although the valve opening times were found to be acceptable, the modification safety evaluation had not been updated prior to the modification to reflect that a "hold" was no longer necessary. The discrepancy was corrected shortly after being brought to the licensee's attention during this inspection.

c. Temporary Alterations

No drawing numbers were provided in temporary alteration log sheets for: (1) Log Sheet No. 90-2-004, Provide Additional Tie in for Generator Cooling (GC) Booster Skid with Tee and Isolation Valve in the GC Booster Discharge Header (2T603AA/B), (2) Log Sheet No. 90-2-50, Raise Voltage on New Cells Installed in Bus 211 Battery, and (3) Log Sheet No. 90-2-52, Replace Lower Sight-glass for the 2B Diesel Generator Fuel Tank Reservoir. The omission of drawing numbers were contrary to BAP-330-2, "TEMPORARY ALTERATIONS," Revision 6, Section 3.a.e, that administratively stated "... referenced drawing should be of sufficient detail so that specific installation points may be reviewed."

BOP DG-11T2, "DIESEL GENERATOR OPERATING LOG," Revision 2, was revised to locally check day tank level with other local readings (e.g., engine temperature, lubrication oil pressure, etc.) at 30 minute intervals when the diesel generator was run for an extended period. The procedure change resulted from the Inspector's safety evaluation review for Log Sheet No. 90-2-52 considering the consequences of losing diesel generator fuel line priming.

4. Modification Safety Evaluations (37700)

The 10 CFR 50.59 analyses and associated safety evaluations for the four major modifications that were reviewed (See Paragraph 3.a) were generally well documented. These safety evaluations, written by corporate engineering, thoroughly supported the conclusions.

The inspectors determined that the safety evaluations performed by the on-site staff had acceptable conclusions; however, additional effort in preparing safety evaluations was warranted based upon the following examples:

- a. M6-1-88-089, Reverse Power Relay, did not state what specific accidents were considered nor address the effects resulting from performing this modification.
- b. M6-2-90-649, DEH System Runback Pushbutton Rewiring, stated that this system did not affect safety without fully supporting this position. The documented conclusion that the system did not affect safety was based solely on its designation as a non-safety related system in the Updated Final Safety Analysis Report (UFSAR), rather than address the fact that only the indication was affected, the mod had no impact on the function of the system.
- c. M6-1-90-611, Removal of the Diesel Generator Reset Linkage, did not provide a description of what this linkage actually accomplished. The "System Description (SD)" book was needed to determine the function of the valves affected.

5. Corporate Engineering Staff Coordination (37700)

The licensee's sharing of experience between the Byron and Braidwood stations was considered a strength. Experience gained from Braidwood was used for the relocation of auxiliary feed pump engine lube oil pressure switches, modification M6-1-88-023. The licensee expected to use experience gained from Byron, modifications M6-2-85-032 and M6-2-90-699, for similar modifications at Braidwood.

6. Quality Program Involvement with Modifications (37700)

Recent QA audits pertaining to modification changes (e.g., Nuclear Quality Programs (NQP) Audit Report Nos. 06-90-04 and 06-90-12) were reviewed and verified against the principal procedure controlling these QA audits (i.e., NQPI No. 16, "REVIEW OF MODIFICATIONS," Revision 0).

Fifteen facility-found deficiencies in the area of modification changes were reviewed for the period between April 1, 1990, and November 21, 1990.

Based on the inspectors review, the facility QA effort in the area of plant modification based upon the type of discrepancies self-identified appeared to be functioning well.

7. Unresolved Items

An Unresolved Item (URI) is a matter about which more information is required to ascertain whether it an acceptable item, a deviation, or a violation. An unresolved item disclosed during this inspection is discussed in paragraph 3.b(2).

8. Exit Meeting

The Exit Meeting was held on January 11, 1991, to discuss the scope and findings of the inspection. The licensee did not identify any documents or processes for this report as proprietary.