

U. S. NUCLEAR REGULATORY COMMISSION

REGION III

Reports No. 50-454/84-24(DE); 50-455/84-17(DE)

Docket Nos. 50-454; 50-455

Licenses No. CPPR-130; CPPR-131

Licensee: Commonwealth Edison Company  
Post Office Box 767  
Chicago, Illinois 60690

Facility Name: Byron Station, Units 1 & 2

Inspection At: Byron Site, Byron, Illinois

Inspection Conducted: April 17 through May 25, 1984

Inspectors: M. Ring

*L. A. Reyes for*  
6/11/84  
Date

A. Dunlop

*L. A. Reyes for*  
6/11/84  
Date

Approved By: L. A. Reyes, Chief  
Test Programs Section

*L. A. Reyes*  
6/11/84  
Date

Inspection Summary

Inspection on April 17 through May 25, 1984 (Reports No. 50-454/84-24(DE); 50-455/84-17(DE))

Areas Inspected: Routine, announced inspection to review licensee action on previous inspection findings; SER confirmatory items; preoperational test procedures; test procedure verification; preoperational test performance; evaluations of preoperational test results; and preoperational test results verification. The inspection involved 215 inspector-hours onsite by 2 inspectors including 44 inspector-hours onsite during off-shifts.

Results: No items of noncompliance or deviations were identified.

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## DETAILS

### 1. Persons Contacted

- \*R. Ward, Assistant Superintendent, Administrative Support Services
- \*D. St. Clair, Technical Staff Supervisor
- \*E. Grennan, Technical Staff
- \*W. Burkamper, QA Supervisor - Operations

\*Denotes those personnel present at the exit interview.

Additional station technical and administrative personnel were contacted by the inspectors during the course of the inspection.

### 2. Licensee Action on Previous Inspection Findings

- a. (Open) Open Item (454/83-12-04(DE)): The remaining issue in this open item involves testing of the Unit-2A diesel generator to support the Unit-1 auxiliary feedwater system. On May 16, 1984, the inspector, (Mr. L. Reyes, Chief, Test Programs Section, and Mr. R. Walker, Chief, Engineering Branch 1) attended a meeting with the licensee at Byron Station wherein the licensee presented proposed testing and proposed Technical Specifications related to the Unit-2 diesel generator. Unusual measures necessitated by the use of a Unit-2 component in the areas of fire protection, security and operability of support systems were discussed. While the item remains open pending completion of the planned testing, the licensee's proposed actions appeared to be adequate.
- b. (Closed) Unresolved Item (454/83-40-02(DE)): This item involved three inspector concerns with respect to preoperational test procedure SI 73.13, "Safety Injection". Item 4.b.(i) and (iii) were closed in inspection report 50-454/84-16(DE)). Item 4.b(ii) involved the test procedure not taking vibration data in all operating modes but rather only in the minimum flow recirculation mode for the Charging (CV), Safety Injection (SI) and Residual Heat Removal (RH) pumps. Subsequently, the licensee has shown that vibration data for the RH and CV pumps was taken in other operating modes in different tests. The SI pumps were only monitored for vibration in the miniflow condition, however, the data from the RH and CV pumps as well as typical centrifugal pump performance history indicate that vibration would be expected to be greatest at the high head, low flow condition of minimum flow recirculation. Hence, miniflow should be adequate to disclose vibration related problems and the inspector has no further concerns in this area.
- c. (Closed) Noncompliance (454/83-47-01(DE)): This item involved a failure to adequately implement the requirements of the FSAR with regard to the qualification of personnel in the preoperational test area. The inspector reviewed the licensee's response contained in a letter from D. Farrar to J. Keppler dated December 30, 1983. In another letter from R. Spessard to C. Reed dated February 6, 1984,

the NRC denied the licensee's request for withdrawal of the violation but noted that the proposed FSAR change should resolve the issue. The inspector has reviewed advance copies of the FSAR change which now delineates the qualification requirements for System Test Engineers and Group Leaders as well as defining which group performs which task. This item is now considered closed.

- d. (Closed) Noncompliance (454/83-47-02(DE)): This item involved a failure to comply with posted cleanliness requirements. The inspector reviewed the licensee's response contained in a letter dated December 19, 1983 from D. L. Farrar to J. G. Keppler. The licensee's response as modified by comments relating to violation 2 in a letter from R. Spessard to C. Reed dated February 6, 1984 was considered acceptable. The inspector has observed various operations in tours of the plant since the occurrence of the violation on October 18, 1983 and has not noted any similar violations. Therefore this item is considered closed.
- e. (Closed) Noncompliance (454/83-47-03(DE)): This item involved a failure to provide controls requiring an evaluation of the validity of previous tests for permanent plant instrumentation when found out of calibration. The inspector reviewed the licensee's response contained in two letters from D. Farrar to J. Keppler dated February 2, 1984 and December 19, 1983. The inspector also reviewed the records of the instruments used to collect acceptance criteria in preoperational tests, the accuracy check on those instruments, deficiencies written, and evaluations as to the effect on test results. The inspector noted that some instruments were found out of tolerance and affected test results which then required retesting. Because of this result, the licensee's original commitment to complete this program prior to 5% power was questioned. The licensee indicated that this program is now expected to complete prior to fuel load at least to the point where any fuel load required systems will have been checked. The inspector considers this satisfactory and noted that the re-evaluation program and records were exceptionally complete, detailed and well documented. The inspector also reviewed a draft of BIP 2000-8 (the response of BAP 2000-8 is a typographical error) addressing instrument discrepancies regarding installed plant instrumentation. Based on the above discussion, this item is considered closed.
- f. (Closed) Unresolved Item (454/83-53-02(DE)): Concerns with respect to the review of the results of preoperational test IP 46.10, "Instrument and Control Power." Items 5.b.iii and v. were the only remaining open concerns. Item 5.b.iii involved the acceptance of the test results based on an extrapolation of lagging power factor testing for inverter 111 to inverters 112, 113 and 114. Project Engineering (PED) has since provided a letter to the station which details the input power requirements for instrumentation fed from the inverters; the most severe battery operating conditions, both design and "as tested;" and the inverter input and output data for all four inverters as tested before the lagging power factor test. This data supports the conclusion that all of the inverters will supply adequate output voltage with inputs ranging from 98.5 to 144

volts DC. Therefore, this portion of the item is considered closed. Item 5.b.v involved closure of deficiency 1766 relating to unexplained breaker openings on three inverters. The deficiency was closed based on the inability to duplicate the problem for only 1 inverter. Further investigation by the licensee determined the problem to be due to the AC input voltage running slightly high on occasion. When the AC input breaker was closed, the inverter produced a slight DC output spike. Since high DC voltage is interlocked with the AC input breaker, the result was a trip of the AC input breaker. The licensee has subsequently modified the inverter startup procedure to minimize the occurrence of this type of problem, therefore this unresolved item is considered closed.

- g. (Closed) Noncompliance (454/83-58-01(DE)): This item involved a failure to follow procedures relating to a minor test change made during preoperational test RP 68.13, "Reactor Protection," and two steps in completed preoperational test CV 18.10, "Chemical and Volume Control - VCT and Charging Pumps," which were not signed. The inspector reviewed the licensee's response contained in a letter from D. Farrar to J. Keppler dated March 23, 1984. The inspector also reviewed the Test Review Board evaluation of the results of RP 68.13 and Technical Staff Memos 9 and 39 which were referenced in the response. The inspector has reviewed several completed tests since the date of the violation and no other unsigned steps have been noted. Based on the above discussion, this item is considered closed.
- h. (Closed) Open Item (454/83-58-03(DE)): This item involved inspector concerns with the review of the results of SI 73.10, "Safety Injection." Item 5.a.i involved Project Engineering (PED) review of the results of completed retest procedure R-56 for Deficiency 2547. PED has now completed their review and accepted the retest results. The inspector has no further concerns in this area. Item 5.a.iii involved retest requirements for deficiency 4005 regarding the retiming of valves whose solenoids were replaced. The licensee is in the process of developing a surveillance program for valves which are required to be stroke timed per Byron Technical Specifications. This open item and several others are closed to a new open item (454/84-24-01(DE)) pending completion of development and performance of the surveillance for valve stroke timing.
- i. (Closed) Open Item (454/83-58-04(DE)): This item involved inspector concerns with respect to the results of CV 18.10, "Chemical and Volume Control - VCT Charging Pumps." All but two of the concerns (5.b.iv and 5.b.vi) were closed in previous reports. Item 5.b.vi involved Deficiencies 7651, 3414, and 3415 on CV instrumentation and whether they need to be retested to meet acceptance criteria 4.1 of CV 18.10. Further investigation has revealed that these instruments were not originally tested in CV 18.10 and hence do not require retesting under acceptance criteria 4.1. The deficiencies had been included in the CV 18.10 test package as a record keeping method in order to keep CV system deficiencies together. This portion of the item is considered closed. Item 5.b.iv involved retest requirements for Deficiencies 2514 and 4003 regarding solenoid replacement and

valve retiming. This item is included in the surveillance program for stroke timing (454/84-24-01(DE)) as discussed in the previous item and is therefore closed.

- j. (Open) Open Item (454/84-07-05(DE)): This item involved six inspector comments with respect to the results of preoperational test CC 10.10, "Component Cooling." Subitems 6.a.i, ii and iv were closed in inspection report 454/84-16(DE)). Subitem 6.a.ii involved retest requirements for Deficiency 2510 regarding valve retiming. The licensee is in the process of developing a surveillance program for valves which are required to be stroke timed. This program is being followed via open item (454/84-24-01(DE)) and this item is closed to that new open item. Subitems 6.a.v and vi remain open.
- k. (Closed) Unresolved Item (454/84-16-02(DE)): This item involved the adequacy of the B Containment Spray (CS) pump to provide the required flow and pressure in the event of a LOCA. In a meeting at Region III office on April 5, 1984, the licensee's Project Engineering (PED) provided the inspector with Sargent and Lundy (S&L) detailed engineering calculations for the purpose of determining orifice size for Containment Spray. These calculations contained determinations of piping friction losses, heights and flows such that observed test data could be substituted into the calculations and a determination of pump adequacy could be made. The inspector has reviewed the above calculations and performed the above substitutions. The inspector concluded that due to the sizeable suction head provided by the Refueling Water Storage Tank (RWST), the CS-B pump coupled to the CS system would be adequate to provide the required flow and pressure necessary to overcome containment backpressure in the event of a LOCA. This unresolved item is considered closed, however, the licensee has subsequently determined CS pump impellers may have been changed from one pump to another so as to render the previous CS testing invalid. This subject will be followed by the inspectors in conjunction with expected retesting of the system. If it becomes necessary to reperform the above calculations, the results will be documented with the retest review.
- l. (Open) Open Item (454/84-16-03(DE)): Concerns from review of results of EF 26.11, "ECCS Full Flow." Item 5.c.i involved the clearance of four deficiencies on component cooling flow based on amperage readings without explaining the flow values. The licensee has subsequently written an Action Item Record (AIR) 6-84-025 which requires the component cooling system flow balance to be performed and proper controls established prior to core load. This subject is also being followed via open item 454/84-07-05(DE) therefore, this portion of the item is considered closed. Item 5.c.ii remains open.
- m. (Closed) Unresolved Item (454/84-16-04(DE)): This item involved the adequacy of the 1A RHR (Residual Heat Removal) pump to provide sufficient discharge pressure at required flow in the event of a LOCA. The pump adequacy was questioned due to Deficiency 9375 which indicated the pump did not meet expected pressures and flows in the EF 26.11, "ECCS Full Flow," test. Project Engineering (PED) resolution of this deficiency indicated the friction drop due to the 50

feet of piping from the pump to the discharge pressure instrument tap accounted for the lower than expected values. In a meeting on April 2, 1984, in PED offices, PED provided the inspector with calculations of line losses which PED believed would substantiate the deficiency resolution. Further, in a meeting at the Resident Inspector's office at the Byron Station, PED provided the inspector with calculations of line loss, velocity head, observed flow, and a comparison of these numbers with observed data to show the system would produce sufficient discharge pressure at required flow. The inspector has reviewed both sets of calculations in addition to performing an independent check and has concluded that the licensee's resolution was adequate.

- n. (Closed) Unresolved Item (454/84-16-05(DE)): This item involved whether the observed data for the Containment Spray (CS) B pump met the stated acceptance criteria in EF 26.11 "ECCS Full Flow" with suction from the containment recirc sump. At a meeting in April 5, 1984, Project Engineering (PED) presented the inspector with calculations which PED indicated would show the data met the criteria. The inspector also met with PED on April 17, 1984 at the Resident Inspector's Office at Byron to discuss the acceptance criteria and the calculations. As a result of this discussion and a review of the calculations, the inspector has concluded that when velocity head, eductor flow and pressure tap losses are taken into account, the CS-B pump data does meet the acceptance criteria. Therefore, this item is closed. It was also noted during the discussions that the acceptance criteria was not particularly appropriate for pump operation in the recirc mode although it was conservative. Had the pump not met the acceptance criteria, the criteria would probably have been changed to values more representative of operation with suction from the containment sump. Subsequently, the licensee has determined that the CS pump impellers had been changed such that this testing may be required to be repeated. Any such developments will be documented in a later report and the above calculations reperformed if necessary.
- o. (Open) Open Item (454/84-16-06(DE)): This item involved three inspector comments noted during the review of the results of preoperational test SI 73.12, "Safety Injection." Comment 5.e.i involved an explanation of the calibration data of vibration measurement instrumentation which was recorded as "next" in the test. The licensee has indicated this meant the next interval. The particular piece of instrumentation is routinely calibrated on a yearly interval. From calibration records, the licensee was able to show the instrument was within a required 18 month calibration interval prior to performance of SI 73.12. The instrument was then sent for calibration following its use in SI 73.12. This portion of the item is considered closed. Comment 5.e.ii involved the range of temperature instrument 1T1-SI058 as being inadequate for its intended use for Refueling Water Storage Tank (RWST) temperature since its range was limited to 75°F and Technical Specifications for RWST temperature indicate a minimum of 35°F and a maximum of 100°F. The licensee has subsequently written an FCR to change the range of the temperature instrument such that the Technical Specification requirements will be

encompassed. Since this FCR is expected to be completed prior to fuel load, the inspector has no further concerns in this area and this portion of the item is considered closed. Comment 5.e.iii remains open.

3. Licensee Action on Commitments Identified in the Byron Safety Evaluation Report (SER)

(Closed) SER Open Item (454/83-00-08(DE)): "Confirmatory Test for Containment Sump Design, SER Section 6.3.4.1." The inspector verified that the licensee has performed actual recirculation testing to demonstrate the sump design and to verify residual heat removal (RHR) net positive suction head (NPSH). This testing was performed in EF 26.11, "ECCS Full Flow." The review of the results of this test is documented in inspection report 50-454/84-16(DE). The test results indicated acceptable sump performance and adequate RHR NPSH. Since the test has not yet been performed on Unit 2, the item is considered closed for Unit 1 only.

No items of noncompliance or deviations were identified.

4. Preoperational Test Procedure Review

The inspectors reviewed the following preoperational test procedure against the FSAR, SER, proposed Technical Specifications and Regulatory Guide 1.68:

VD 86.10, "Diesel Generator Ventilation"

No items of noncompliance or deviations were identified.

5. Preoperational Test Procedure Verification

The inspectors reviewed the following preoperational test procedure and verified that it was written, reviewed and approved by licensee management in accordance with the requirements of Reg. Guide 1.68 and the licensee's QA Manual:

VQ 94.11, "Hydrogen Recombiner"

No items of noncompliance or deviations were identified.

6. Preoperational Test Performance

The inspector witnessed the performance of portions of the below listed preoperational test procedures in order to verify that testing is conducted in accordance with approved procedures, independently verify the acceptability of test results and evaluate the performance of licensee personnel conducting the tests.

FW 34.11, "Main Feedwater - Split Flow"

MS 51.11, R-208, "Main Steam - PORVs Retest"

RP 68.10, C-74, "Reactor Protection - Time Response Component Demonstration"

No items of noncompliance or deviations were identified.

## 7. Preoperational Test Results Evaluation

The inspectors reviewed the results of preoperational test RC 63.10, "Hot Functional," to verify all test changes were identified and approved in accordance with administrative procedures; all test deficiencies were appropriately resolved, reviewed by management and retest as required; test results were evaluated by appropriate engineering personnel and specifically compared with acceptance criteria; data was properly recorded, signed, dated and documented as test deficiencies if out of tolerance, test packages were reviewed by QA for adequacy of contents; and test results were approved by appropriate personnel. The following items were noted:

- a. Project Engineering did not completely approve the test results and retesting is being required for some areas. Project Engineering completion of review and approval of results will be followed as an open item (454/84-24-02(DE)).
- b. Quality Assurance had not yet completed a review of the test results. Completion of the QA review will be followed as an open item (454/84-24-03(DE)).
- c. The Hot Functional Test was a very large test with much data and many deficiencies. The inspector's review consequently produced many questions which were communicated to the licensee. The licensee has not yet had the opportunity to respond to the inspector's questions, therefore, the results of the inspector's review will be documented in a subsequent inspection report. The inspectors also noted that the licensee intends to repeat some portions of the test which may resolve some of the questions.

The inspectors also commenced the results review of preoperational test VD 86.10, "Diesel Generator Ventilation." However, this review is not yet complete and will be documented in a subsequent inspection report.

No items of noncompliance or deviations were identified.

## 8. Preoperational Test Results Verification

The inspectors commenced a review of preoperational test VQ 94.11, "Hydrogen Recombiner" in order to verify test results were reviewed against approved acceptance criteria and an evaluation of the results had been performed in accordance with Regulatory Guide 1.68 and the licensee's Startup Manual. The inspector's review was not complete at the time of the exit and will be documented in a subsequent inspection report.

No items of noncompliance or deviations were identified.

## 9. Open Items

Open items are matters which have been discussed with the licensee, which will be reviewed further by the inspector, and which involved some action on the part of the NRC or licensee or both. Open items disclosed during the inspection are discussed in Paragraphs 7.a, 7.b, and 2.h.



10. Exit Interview

The inspectors met with licensee representatives (denoted in Paragraph 1) at the conclusion of the inspection on May 25, 1984. The inspectors summarized the scope of the inspection and the findings. The licensee acknowledged the statements made by the inspectors with respect to the open items.