



Commonwealth Edison

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June 14, 1984

Mr. James G. Keppler
Regional Administrator
U.S. Nuclear Regulatory Commission
799 Roosevelt Road
Glen Ellyn, IL 60137

Subject: Byron Generating Station Units 1 and 2
I&E Inspection Report No. 50-454/84-16

References (a): April 17, 1984 letter from R. D. Walker
to Cordell Reed.

(b): May 18, 1984 letter from D. L. Farrar
to J. G. Keppler.

Dear Mr. Keppler:

This letter provides a revised response to the Notice of Violation issued in reference (a). Attachment A to this letter contains the revised response which addresses NRC comments on our original response. This response supersedes the one provided in reference (b).

Please address any questions you may have regarding this matter to this office.

Very truly yours,

D. L. Farrar

Director of Nuclear Licensing

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Attachment

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ATTACHMENT A

RESPONSE TO NOTICE OF VIOLATION

VIOLATION

10 CFR 50, Appendix B, Criterion XI, Test Control, as implemented by the Commonwealth Edison Quality Assurance Manual, Quality Requirement 11.0 and the Byron Startup Manual requires that test results be evaluated to assure conformance with design and performance requirements; that the data display the adequacy of the equipment to meet specified requirements; and that appropriate and calibrated test equipment be used.

Contrary to the above, the following examples of inadequate implementation of the test program were identified:

1. The Byron Test Review Board analyzed the incorrect curves for the two containment spray pumps in the evaluation of the results of preoperational test procedure CS 17.10, "Containment Spray." Commonwealth Edison's Project Engineering Department failed to correct the Test Review Board error.
2. The Byron Test Review Board analyzed the incorrect curves for the two residual heat removal pumps in the evaluation of the results of preoperational test procedure RH 67.10, "Residual Heat Removal." Commonwealth Edison's Project Engineering Department failed to correct the Test Review Board error.
3. The Byron Station failed to provide all of the strip chart recordings from preoperational test procedure EF 26.11, "ECCS Full Flow," to the Project Engineering Department so that a complete evaluation of the results could be made.
4. The calibrated signal generator chosen by the Byron Technical Staff to serve as a calibration check of the strip chart recorders used in preoperational test procedure EF 26.11, "ECCS Full Flow," was not appropriate in that its setting was changed and its calibration rendered meaningless.
5. Both safety injection pumps were operated at less than 45 gpm in violation of precaution 8.5.1 of preoperational test procedure SI 73.12, "Safety Injection-Flow Balance."
6. Both residual heat removal pumps were operated at less than 500 gpm in violation of precaution 8.6.1 of preoperational test procedure SI 73.12, "Safety Injection-Flow Balance."

Response to Items 1 and 2:

As noted in the inspection report, the Byron Test Review Board (TRB) misinterpreted the pump curve. The axis of each pump curve was considered to be the total pump discharge head instead of the total pump developed head. Although this incorrect interpretation of the pump curves was used by the Byron TRB in their evaluation of the containment spray and residual heat removal pumps, Project Engineering's review of pre-operational tests CS-17.10 and RH-67.10 determined the performance of the CS and RHR pumps to be acceptable through the correct interpretation of the pump curves. Project Engineering's review discovered the incorrect interpretation of the pump curves by the TRB but neglected to disclose this finding to the TRB in their comments.

It was also later identified by TRB that the curves initially used by TRB to analyze the CS pumps were not the certified curves. They were curves which had been supplied as a part of the pump vendor's proposal. Certified curves were requested and received from the pump manufacturer.

Upon review of the certified pump curves, the performance of the 1A CS pump was found to be above the pump performance curve whereas the data for the 1B CS pump was found to be below the pump performance curve and indicated marginal performance. Further investigation of the pump and motor serial numbers determined that the "A" pump impeller (low flow) was located in the B pump (high flow) casing and that the "B" pump impeller (high flow) was located in the "A" pump. Based upon this evaluation, a potential 10CFR 50.55(e) report was made to NRC - Region III identifying this pump impeller deficiency. Subsequent to this report, both the 1A and 1B CS pumps were pulled and the impellers were reinstalled. Changing the motors was not required since the motors are similar. By design, the low flow impeller is to be positioned in the "A" pump location and the high flow impeller in the "B" pump location.

The RHR pumps' performance was determined to be acceptable.

Corrective Action Taken on Items 1 and 2:

On June 9 and 10, a retest of the 1A and 1B containment spray pumps was conducted with the proper pump/impeller alignment. Preliminary data indicate that pump performance meets the test acceptance criteria. The retest will be reviewed by TRB and Project Engineering for final acceptance.

Additionally, Project Engineering has re-reviewed the following listed preoperational tests. The purpose of this re-review was to reconcile any discrepancies between the Station TRB results and Project Engineering TRB results with respect to acceptance criteria.

03.10	Auxiliary Feedwater
18.11	CVCS
31.10	Fuel Pool Cooling
46.10	I & C Power
51.10	Main Steam
51.11	Main Steam - PORV's
52.10	Excore Detectors
63.11	RC MOV
63.12	RC I & C
69.10	Pressurizer
73.12	Safety Injection
86.10	Diesel Generator Ventilation
99.10	Switchgear Ventilation

Action to Prevent Further Violations:

Project Engineering personnel have been instructed to clearly list any future corrections or differences with regard to the TRB analysis of results in the PED review letter to the TRB. The station's Post TRB Checklist (TSM #10) has been modified to include an item to remind the TRB to specifically call out any items requiring PED response.

TRB will review pump curve data to ensure axial coordinates are labeled properly and that test data meets the test acceptance criteria. Also, a Tech Staff seminar will be conducted on the use of pump curves at the next Tech Staff meeting on June 22.

Full Compliance Date for Items 1 and 2:

June 22, 1984

Response to Item 3:

The Byron Station TRB initially failed to provide PED with all of the strip charts for the EF-26.11 preoperational test. Upon PED request some strip charts were subsequently provided. After identifying that PED had not received all of the strip charts, the balance of the strip charts were transmitted to PED for review. The review of all strip charts indicated that the partial strip charts which were previously transmitted and reviewed were sufficient to perform the complete test review.

Corrective Action Taken on Item 3:

PED analyzed and approved the EF-26.11 test results based upon the strip charts initially provided for their evaluation. Subsequently, PED was appraised that all of the strip charts had not been submitted to them. The complete strip charts were then reviewed by PED and it was determined that their initial acceptance and approval was not invalidated. All strip charts sent to PED for pre-operational test review prior to the review of EF-26.11 have been verified to be correct and test data was found to be interpreted correctly.

Action to Prevent Further Violations:

The Post Test Review Checklist, which is contained in Tech Staff Supervisor Memo #10 has been modified to include a statement to determine what data (rough or final) should be included in the review package to PED. A checklist is also being used to ensure all necessary information is sent to and received by PED.

Full Compliance Date for Item 3:

May 15, 1984

Response to Item 4:

During the collection of acceptance criteria data for the EF-26.11 preoperational test, non-certified strip chart recorders were utilized. To compensate for this, a calibrated digital signal generator was connected to the recorder to provide a time base on the strip charts.

Upon investigation, it was determined that the linear dial setting on the digital signal generator was positioned to a frequency other than the desired frequency of 1 hz, resulting in an error in the time base on the strip charts.

However, during the actual measurement and collection of test data the signal generator input was disconnected from the strip chart recorder and the recorder speed was set to 10mm/sec. The test data collected was evaluated based on the recorder speed input and not the signal generator trace.

Corrective Action Taken on Item 4:

Each strip chart recorder used to collect data was subsequently checked to verify its accuracy. For a chart speed of 10mm/sec, the recorders were determined to be accurate to within $\pm 0.5\%$. Project Engineering independently evaluated the test results and determined that the chart speed was accurate. Based on these analyses by the TRB and PED, the test data for pre-operational test EF-26.11 was found to be acceptable.

Action to Prevent Further Violations:

Byron Station has reviewed previous uses of strip chart recordings for data collection in order to ensure the adequacy of test results. Furthermore, Tech Staff Supervisor Memo #35, "Guidelines for Strip Chart Recorders" has been revised to incorporate comments as necessary.

Full Compliance Date for Item 4:

June 1, 1984

Response to Items 5 and 6:

Within preoperational test procedure SI-73.12, precaution 8.5.1 states "Do not operate a safety injection pump at less than the design minimum flow of 45 gpm". Also, precaution 9.6.1 in the SI-73.12 test states "Do not operate a residual heat removal pump at less than the design minimum flow of 500 gpm".

Within the execution of SI-73.12 both the SI and RHR pumps were operated below these minimum flow levels. In both cases the STE was aware of the precautions and had determined no damage would occur at the lower flow rates. However, no deficiency or test change request was written.

Corrective Action Taken on Items 5 and 6:

Operation of the RHR and SI pumps below the flowrate listed in the test "Precautions" was reviewed by the STE and PED and found to be acceptable. Therefore, no corrective action is required.

Action to Prevent Further Violations:

Technical Staff Supervisor Memo #07, "Documenting of Improper/ Incorrect Actions During Testing" was expanded to specifically include precautions and required corrective actions.

Full Compliance Date for Items 5 and 6:

May 15, 1984

Extended Review Based Upon NRC Comments:

In addition to the review of EF-26.11, the Integrated Hot Functional Test RC 63.10 was reviewed by the Test Review Board to assess final disposition of open items, open deficiencies, and PED comments as well as attention to the comments raised by the NRC which may be applicable to this non-compliance citation. Test Review Board determined that additional testing must be conducted during Unit 1 Hot Operations scheduled in August 1984, to resolve open items resulting from data taken in section 9.31 and inconsistencies in the cooldown rate data listed in Section 8.0 (Precautions) and Operating procedure BGP 100-5. These open items and any other deficiencies identified during the Hot Operations test will be resolved between the TRB and Project Engineering. It should be noted that strip chart data taken during the IHF test properly conforms to the Tech Staff Memo #35 and was sent to PED for their final review and approval.