

U.S. NUCLEAR REGULATORY COMMISSION
OFFICE OF INSPECTION AND ENFORCEMENT

REGION III

Report No. 50-454/80-23

Docket No. 50-454

License No. CPPR-130

Licensee: Commonwealth Edison Company
P.O. Box 767
Chicago, IL 60690

Facility Name: Byron Station, Unit 1

Inspection At: Byron Site, Byron, Illinois

Inspection Conducted: December 10-12, 1980, January 29-30, 1981

Inspectors: *[Signature]* N. Choules (December 10-12, 1980,
January 29-30, 1981)

2/26/81

P. Wohld (December 10-12, 1980,
January 29-30, 1981)

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[Signature]
J. Streeter (December 10-12, 1980,
January 30, 1981)

2/26/81

Approved By: *[Signature]* J. Streeter, Chief
Nuclear Support Section 1

2/26/81

Inspection Summary

Inspection on December 10-12, 1980, January 29-30, 1981 (Report No. 50-454/80-23)

Areas Inspected: Routine announced inspection of preoperational test program administration; preoperational document control; administrative control of cleanliness, training, procedure development, temporary leads, out-of-service procedures, test equipment, preoperational test procedures; and role of quality assurance during preoperational testing. The inspection involved 85 inspector-hours onsite by four NRC inspectors, including 0 inspector hours onsite during off-shifts.

Results: No items of noncompliance or deviations were identified.

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DETAILS

1. Persons Contacted

- *R. Querio, Station Superintendent
- *R. Ward, Assistant Superintendent Administration and Support Services
- *P. Ervin, Technical Staff Supervisor
- *R. Pleniewicz, Assistant Superintendent Operating
- *L. Sues, Assistant Superintendent Maintenance
- *D. St. Clair, Assistant Technical Staff Supervisor
- *C. Tomashek, Startup Coordinator
- T. Higgins, Training Supervisor
- J. Pudas, System Test Engineer
- P. Johnson, Electrical Group Leader
- A. Chomacke, Preoperational Test Coordinator
- J. Porter, Senior QA Inspector
- J. McIntire, QA Supervisor
- G. Abrell, Director QA Operating
- G. Grubins, System Test Engineer - Thermal Group Leader

*Denotes those attending the exit interview.

2. Preoperational Test Program

The licensee's commitment in the FSAR to Reg. Guide 1.68 was discussed. The inspectors informed the licensee that Region III interpreted the current wording of the FSAR to mean that Byron was committed to Rev. 2 of Reg. Guide 1.68. The licensee stated that he believed it was his intent to commit to Rev. 0 of Reg. Guide 1.68 and that he would pursue a FSAR change to that effect.

A summary of some recent preoperational test problems encountered at other plants was discussed with the licensee (see Attachment A). The licensee agreed to review those problems and ensure administrative controls are in place to minimize the occurrence of similar problems at Byron. This review is scheduled to be completed by April 1, 1981. This is an open item (454/80-23-01) pending further review by the inspector.

The inspectors reviewed the licensee's description of the preoperational test program to determine that general areas of testing were identified and responsibilities have been assigned for the following:

- a. Flushing and cleaning systems
- b. Hydrostatic testing
- c. Instrument calibration
- d. System turnover

- e. Functional demonstration of equipment
- f. Electrical, mechanical and instrument and control testing

The inspectors determined that the Byron organizational chart, startup manual, flushing manual and calibration instructions adequately identified and assigned responsibility for the above testing areas.

The inspectors reviewed the licensee's test program to ensure that it includes requirements for testing consistent with FSAR commitments such that tests to be performed have been identified and sequenced. The inspectors determined that the licensee's list of tests and schedule of performance meet those requirements. Additionally, the licensee maintains a sequence of performance board to illustrate controlling path items. The inspectors reviewed the program to ensure that for each of the identified tests the following was identified:

- a. Test objectives
- b. Summary of the test
- c. Necessary prerequisites
- d. Acceptance criteria

In order to evaluate the licensee's program, the inspectors utilized the Byron FSAR, the start-up manual, and Reg. Guide 1.68. The inspectors determined that the areas of acceptance criteria and test objectives were not very well defined in existing licensee documents. The licensee explained that the start-up manual was in the process of revision in those areas. He stated that the manual will be revised to show that acceptance criteria will be available prior to the performance of the test and that the criteria will be numerical when appropriate. Additionally, general references from which the test criteria are obtained will be included in Section 5 of the test procedures.

3. Test Organization

The inspectors reviewed the licensee's organization in order to determine that responsibilities, method of appointing, and lines of authority for key test personnel were formally specified in writing. Additionally, interfaces between organizations were examined to verify that organizational responsibilities were clearly established. The start-up manual, the Byron FSAR and Byron organizational charts were used for this review. The inspectors determined that the above areas were adequately addressed in the referenced documents with the exception of responsibility for test procedures objectives and acceptance criteria. The licensee stated that the project engineering section is charged with the responsibility for development of adequate test objectives and acceptance criteria. He also stated that project engineering reviews test procedures to assure they reflect the objectives and reviews test results to assure that systems meet design

requirements. The licensee further stated that the startup manual will be revised to reflect these responsibilities.

4. Test Program Administration

The inspectors reviewed the licensee's program to verify that methods have been established for the test group to receive jurisdiction over systems from other organizations. The program was also reviewed to verify that administrative procedures provide for:

- a. Control of system status prior to testing
- b. Return of systems or components to construction for modification or repair
- c. Control of system status subsequent to testing

The inspectors determined that the system turnover and system status notice procedures as described in the startup manual and the work request system as described in Byron's total job management procedure provide adequate administrative measures for the above areas.

The inspectors reviewed the licensee's program to verify that administrative measures have been established to govern the conduct of testing including the following:

- a. Method to verify a test procedure is current prior to its use
- b. Method to assure personnel involved in the conduct of a test are knowledgeable of the test procedure
- c. Methods to change a test procedure during the conduct of testing
- d. Criteria for interruption of a test
- e. Methods to coordinate the conduct of testing
- f. Methods to document significant events
- g. Methods for identifying and documenting deficiencies and their resolutions

The inspectors determined that the licensee's startup manual established methods to control these areas. Additionally, the licensee's out-of-service card system provides the method for coordinating testing with other work in the areas. This system is administered by operations and the shift engineer is the controlling individual. As a part of detailed discussion on conduct of testing, the inspectors determined that the licensee had no specific instructions on valve and switch line-ups. The inspectors informed the licensee that an instruction on valve and switch line-ups should be developed. The training program may be an adequate location for such an instruction. This is an open item (454/80-23-02) pending further review by the inspector.

In order to verify that formal methods have been established to control scheduling of test activities, the licensee's program in this area was reviewed. The inspectors determined that the combination of computer lists of scheduled tests and the startup manual's assignment of responsibility adequately covered the area.

The inspectors reviewed the licensee's program for the evaluation of test results to verify that it contained provisions for the following:

- a. Reduction of test data to meaningful and understandable form
- b. Checking of test results and comparing to previously determined performance standards
- c. Identification of deficiencies and their corrective action
- d. Testing, following corrective action or modifications, to ensure system is adequately tested
- e. Appropriate review of results

The inspectors determined that the startup manual contains adequate provisions for the evaluation of test results with the exception of comparing results with acceptance criteria and objectives. These areas of disagreement and the licensee's commitment relative to them are discussed in Paragraphs 2 and 3 of this report.

5. Document Control

The licensee's program for test procedure control was reviewed to verify that administrative measures had been established to control review, approval and issuance of test procedures and revisions. In addition, the program was reviewed to verify that the responsibilities for implementation of these controls had been assigned in writing. The licensee's startup manual was the major document used in the review.

The inspectors determined that the startup manual did not provide for the control of obsolete or incomplete test procedure copies. The licensee agreed to review the matter. The inspectors determined that the licensee also utilizes a station procedure for test procedure issue, distribution and test records in addition to the startup manual. The licensee agreed to provide a copy of these station procedures to the inspectors. The inspectors also determined that the startup manual did not require minor changes to be incorporated into all "approved for test" copies of the test procedure. The licensee agreed to reword the startup manual to have major and minor (or "all") test procedure changes incorporated into all "approved for test" copies via the change issuance procedure. This is an open item (454/80-23-03) pending further review by the inspector.

The inspectors reviewed the licensee's program to verify that master indexes are available for drawings and manuals which indicate their current revision number and a mechanism exists to ensure test procedures will be updated when manual or drawing revisions occur. The inspectors determined that the licensee's system of master indexes was described in a station procedure and the licensee agreed to provide a copy of that procedure to the inspectors for review. The inspectors determined that the licensee has a method of ensuring test procedures get up-dated to drawing revisions and it consists of two parts. The first part is controlled by the pre-test review. At the pre-test review point, a review and system walkdown are performed to coordinate the test procedure and the latest drawing revision at the time of pre-test review. The pre-test review system is described in the startup manual. Following the pre-test review, the work request and system status notice (SSN) systems ensure a review is made to determine the need for test changes before any system changes to reflect drawing revisions are made. These systems are described in the startup manual and the total job management manual.

6. Temporary Modifications, Jumpers and Bypasses

The inspectors reviewed the licensee's program to verify that written administrative controls had been established for controlling temporary modifications, jumpers and bypasses. The program was reviewed to verify that the controls required a formal log be maintained of the status of jumpers, lifted leads, etc; that responsibility for maintaining the log is assigned; that jumpers or lifted leads will be readily identifiable by their physical appearance and that controls are established to account for installation and removal of spool pieces, strainers and blank flanges where testing requires modification to fluid systems.

Regulatory Guide 1.68 and ANSI 18.7 were utilized to review the licensee's procedure, BAP 300-5, on jumpers and lifted leads.

The inspectors determined that BAP 300-5 satisfactorily provided administrative controls for jumpers and bypasses with the following exceptions.

BAP 300-5 does not control mechanical items such as spool pieces and strainers. The licensee explained that, in general, temporary mechanical components are controlled via the work request and SSN systems. No separate mechanical procedure has been developed partly due to expected infrequent use. The licensee agreed to examine the need for a procedure to control such things as removal of temporary strainers. This is an open item (454/80-23-04) pending further review by the inspector.

The inspectors noted that the procedure did not contain provisions for independent verification of installation or removal. The licensee agreed to make provisions for independent verification. The inspector's concern that temporary jumpers be readily recognizable was satisfied by the use of identification tags on jumpers.

7. Startup Manual and Startup Guidelines

In order to assure that all systems important to safety are properly controlled and tested during the preoperational and startup program and in accordance with the provisions of 10 CFR 50 Appendices A and B the licensee developed the Startup Manual. The inspectors reviewed the Startup Manual with the understanding that it was the controlling document for satisfying the provision of 10 CFR 50 Appendices A and B and determined that it appeared to be adequate, with the exception of specific matters discussed in other Paragraphs (2, 3, 4, 5, and 10) of this report, to assure that programmatic testing commitments and Appendix A and B requirements are met.

In addition to the Startup Manual, the licensee has also developed Startup Guidelines. The inspectors reviewed the Startup Guidelines with respect to the Startup Manual and indicated to the licensee those areas of the guidelines which would be more appropriately contained in the Startup Manual. This is an open item (454/80-23-05) pending further review by the inspector. The guidelines document (with comments) includes all of the information in the Startup Manual and gives very detailed supplemental information on how to accomplish the Startup Manual requirements. The inspectors viewed the Startup Guidelines as similar to administrative directives. The Startup Guidelines are not considered mandatory and failure to follow them would not constitute noncompliance unless the failure resulted in failure to meet the provisions of the Startup Manual or indicated an inadequacy in the Startup Manual.

The inspectors cautioned the licensee in the inherent problems in maintaining consistency in the systems which overlap such as is the case with the Startup Manual and Startup Guidelines. The licensee will develop positive controls to assure that changes in either system will be reviewed to determine the impact on the other. This is an open item (454/80-23-06) pending the licensee developing these positive controls.

8. Test Procedures

The inspectors reviewed two test procedures, 2.24.11, "Diesel Fuel Oil - Essential Service Water", and 2.21.10, "125 Volt DC Distribution" against the requirements of Reg. Guide 1.68 and the Byron FSAR Chapter 14. The inspector had several questions particularly in the areas of test scope and acceptance criteria. The licensee agreed to revise the procedures and factor in the inspector's comments. This is an open item (454/80-23-07) pending completion of the revisions and further review by the inspectors.

9. Equipment Protection and Cleanliness

The inspector discussed and reviewed with the licensee his plans during preoperational testing for the following:

- a. Housekeeping for areas and equipment
- b. Maintaining the appropriate degrees of cleanliness of nuclear plant components and piping.
- c. Water chemistry controls for fluid systems undergoing preoperational testing.

For Item a., the licensee plans to prepare procedures covering housekeeping. This is an open item (454/80-23-08) pending inspector review of completed procedures.

For Item b., the licensee indicated cleanliness will be maintained utilizing the following, depending on the specific conditions.

- (1) Rentry control and construction procedures. Rentry controls are specified in the startup manual.
- (2) Maintenance work request and specially prepared cleanliness procedures for specific components if not covered under another program.
- (3) The requirements of the flushing manual for systems to be turned over for prep from construction will be used.
- (4) The licensee committed to preparing a procedure to control the water quality of systems for the time period when a system is turned over from construction for preoperational testing until it is finally turned over to operations.

For Item 9.c., the licensee indicated the chemistry department is developing water chemistry control procedures for individual plant systems.

10. Test and Measurement Equipment

The inspectors reviewed and discussed with the licensee his program and administrative procedures for control of test and measurement equipment during the prep and startup programs to determine if the program addressed the following:

- a. A listing of controlled test equipment, the calibration requirements, and the calibration history.
- b. Controls for storage and issuance to preclude use of equipment which has not been calibrated within the specified interval.
- c. Requirements for recording test equipment identity and calibration date in test procedures to permit retest if equipment is subsequently found out of calibration.

The review indicated that the licensee's administrative procedures did not include the first two items. Item c. requirements are/will be included on calibration data sheets and in individual preop procedures. The licensee agreed to prepare an administrative procedure to cover the general overall control of test and measuring equipment including Items a., b., and to include Item c. requirements in the startup manual. This is an open item (454/80-23-09) pending further review by the inspector.

11. Training

The inspectors reviewed with the licensee his program for training of test personnel in the following areas of the preop and startup test program.

- a. Test procedure preparation
- b. Test procedure approval
- c. Test performance and documentation
- d. Test results review and approval
- e. Administrative controls for testing
- f. QA/QC for testing
- g. Technical objectives of testing

The licensee's representatives indicated that training in above area had been accomplished or would be, but until this time no documentation of training had been kept. The inspector requested and the licensee agreed that written records of all future training would be kept. The licensee also committed to training any new test personnel in the above areas.

12. Preoperational Testing Quality Assurance

The inspectors met with licensee quality assurance personnel and others associated with the preop test program. The role of Quality Assurance during the preop testing was discussed. This area will be reviewed in depth in a later inspection.

13. Exit Interview

The inspectors met with licensee representatives (denoted in Paragraph 1) on January 30, 1981. The inspectors summarized the scope and findings of the inspection. In addition, two telephone conversations were conducted regarding the open item of Paragraph 2 on February 3 and the contents of Paragraph 7 on February 18, 1981. The licensee acknowledged the statements by the inspectors with respect to the open items.

Attachment: Recent Preoperational Test
Problems Encountered at Other Plants

ATTACHMENT A

RECENT PREOPERATIONAL TEST PROBLEMS ENCOUNTERED AT OTHER PLANTS

I. Turnover

- a. No documentation included in turnover package for an air blow used to clean components in diesel generating air start system. No specific acceptance criteria for cleanliness were used. Subsequently, one set of air start motors failed due to dirt in an air valve.
- b. Several components turned over for pre-op testing were lacking blue tags indicating release for pre-op testing. Components temporarily turned back to construction were not tagged to indicate that status.
- c. Turnover package for diesel generator system did not identify jumpers which master jumper log and another jumper log identified as being installed. (Jumpers were not installed.)
- d. Approximately 10% of tags on KHR and Reactor Protection System indicating release for pre-op testing were missing or mutilated.
- e. System release for pre-op testing did not include several components. Tag identifying release for pre-op testing for a component was hung on piping vice the component and tag remained when component was removed for calibration.
- f. Two different revisions, each designated 01, to the RHR System pre-op test release were found to be in use.

II. Test Procedure

- a. Licensee review of the integrated leak rate test was not adequate to uncover significant deficiencies.
- b. Test procedure measuring response time for turbine control valve fast closure did not include acceptance criteria listed in design documents.
- c. The 250VDC Battery Test was terminated without making an approved change to the procedure and without completing the actions required by the procedure.
- d. Procedure on reactor recirculation and flow control did not contain precautions or limitations necessary to protect the reactor vessel against thermal transients.
- e. "Minor Change Request" was approved when the intent of the procedure was changed.

- f. Vibration instrument was used which was not listed in the required test equipment section of the procedure.

III. Calibration

Calibrations of entire instrument loops were not always being performed prior to pre-op testing. No program existed for conducting periodic calibrations during the construction phase of the plant prior to acceptance of a system for operation.

IV. Jumper and Temporary Power Control

- a. Removal of the electrical jumpers in a diesel generator panel was not verified and documented in master jumper log. Situation existed for four months.
- b. No procedure established for shift engineer to control status of electrical power leads during station construction. Originated with a personal injury accident.

V. Cleanliness

Lack of a program to maintain adequate cleanliness as evidenced by a foreign substance high in chlorides found adhering to the inside of the reactor vessel wall, head core support plate and feed sparger inlet box; dust, grit and debris such as cups, cigarette packs and beer cans found in diesel generator, TIP machine and reactor control panels.

VI. Document Control

Motor operated valve torque switch setting lists issued by station nuclear engineering department were not controlled in that several incomplete, inconsistent or obsolete lists were being used at site.

VII. Deficiency Documentation

Two weeks elapsed between the identification of a damaged thermocouple on reactor vessel bottom drain and the generation of a deficiency report. One month elapsed between the time that recirculation loop suction temperature instruments were known to be giving inaccurate readings and the issuance of a deficiency report.

VIII. Valve Lineups

Several valves which should have been shut (one should have been tagged shut) were left open and as a result high pressure core spray and condensate and low pressure core spray were cross-connected causing a rupture of the steam hot air ejector condenser.