

U. S. NUCLEAR REGULATORY COMMISSION

REGION III

Reports No. 50-454/88005(DRS); 50-455/88004(DRS)

Docket Nos. 50-454; 50-455

Licenses No. NPF-37; NPF-66

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

Facility Name: Byron Station, Units 1 and 2

Inspection At: Byron Station, Byron, Illinois

Inspection Conducted: January 13 through March 17, 1988

Inspectors:	A. Dunlop, Jr. <i>Andrew Dunlop Jr</i>	<u>3-28-88</u>
	Lead Inspector	Date
	<i>R. A. Hasse</i>	<u>3/28/88</u>
	R. A. Hasse	Date
	<i>P. R. Rescheske</i>	<u>3/28/88</u>
	P. R. Rescheske	Date
	<i>R. Mendez</i>	<u>3/28/88</u>
	R. Mendez	Date
Approved By:	<i>M. P. Phillips</i>	<u>3/28/88</u>
	M. P. Phillips, Chief	Date
	Operational Program Section	

Inspection Summary

Inspection from January 13 through March 17, 1988 (Reports No. 50-454/88005(DRS); No. 50-455/88004(DRS)).

Areas Inspected: Routine, unannounced safety inspection of licensee actions on previous inspection findings (92701, 92702) startup test results evaluation (72301, 72400, 72596, 72600, 72608, 72616, 72624); and startup test results verification (72301, 72596, 72600, 72608, 72616, 72624).

Results: No violations or deviations were identified. The licensee's review of the startup test results were adequate to address the results and any concerns identified during testing.

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DETAILS

1. Persons Contacted

Commonwealth Edison Company (CECo)

- R. Querio, Station Manager, Byron/Braidwood
- *R. Pleniewicz, Station Manager
- *R. Ward, Services Superintendent
- *W. Burkamper, Quality Assurance Superintendent
- *T. Joyce, Superintendent, Production
- *L. Sues, Assistant Superintendent, Technical Services
- R. Choinard, Technical Staff, Nuclear Group Lead
- D. Schrader, Technical Staff, EQ Group Lead
- R. Steder, Technical Staff, Modification Group
- K. Pasmore, Technical Staff, Ventilation Group
- E. Lamken, Regulatory Assurance Staff
- *R. Flahive, Technical Staff Supervisor
- *G. Stauffer, Regulatory Assurance Assistant Supervisor
- *E. Zittle, Regulatory Assurance Group
- *T. Tulon, Assistant Superintendent, Operating

U.S. Nuclear Regulatory Commission (NRC)

- *P. Brockman, Senior Resident Inspector, Byron.

The inspector also contacted and interviewed other licensee and contractor personnel during the course of this inspection.

*Denotes those present during the exit interview on March 17, 1988.

2. Action on Previous Inspection Findings

- a. (Closed) Open Item (454/85008-02(DRS)): This item concerned the results of RC 63.32, "Reactor Coolant Flow Coastdown," on Unit 1 in that the results did not document the methodology used by Westinghouse to ensure that the test requirements were satisfied. The licensee has written a letter-to-file (File 5.63.32) dated September 30, 1987, which delineate the procedure, Westinghouse NSSS Startup Manual Reactor Coolant Flow Coastdown Test Draft CVA-SU-2.1.8, which described the flow coastdown data reduction methodology. This was adequate to address the inspectors concern of a complete test package. This item is closed.
- b. (Closed) Open Item (454/85035-02): This item concerned startup test 2.61.33, "Radiation Surveys During Power Ascension," which contained neutron dose rates for 19 radiation base points that exceeded the acceptance criteria levels. Station Nuclear Engineering Department study (Action Item Request (AIR) 6-86-19) was conducted to review reactor neutron shielding and proposed design changes, if any, to reduce the neutron dose at the containment air lock and near the

reactor head. The study determined that the person-rem saving of 1.5 to 6 person-rem per year did not justify the cost of reactor shielding changes; as such, no shielding or design changes would be implemented. This item is closed.

- c. (Closed) Unresolved Item (454/86045-01(DRS)): This item concerned the four cold starts of the diesel generator (DG) from a single air receiver without recharging the air receiver between starts. The licensee had performed preoperational test 2.22.10, "Diesel Generator," which verified the DGs would start four times with an air receiver starting pressure of less than or equal to 175 psig. The inspector had reviewed the test and had no further concerns. This item is closed.
- d. (Closed) Unresolved Item (454/85035-01(DRS)): This item concerned startup test 2.52.36B, "Axial Flux Calibration," in that the inspector noted the resolution of test deficiency 2C1, lower flux deviation alarm illuminated, appeared inadequate. The inspector concluded that the concern had been adequately addressed by additional information provided by the licensee. This item is closed.
- e. (Closed) Violation (455/86034-01): This item concerned the failure to document deficiencies for preoperational tests. The corrective actions for examples (b) and (c) were discussed in inspection report 455/86034. For example (a), the valves identified in test 2.18.61, "Chemical and Volume Control-Charging, Letdown, and Reactor Coolant Pump Seal Injection Logic," that did not meet the 20% agreement between their local and remote stroke times were either retested or a technical evaluation was performed in order to accept the results. To prevent reoccurrence, the licensee held a department meeting on October 23, 1986, which addressed the importance of initiating deficiencies. Tech Staff Memo #ST03.07 dated October 31, 1986, disseminated the meetings discussion. In addition, Tech Staff Memo #ST04.01 incorporated an additional check list during post test startup results reviews to provide emphasis to scrutinize the executed test for deficiencies. The actions taken by the licensee appeared adequate to correct the concern. This item is closed.
- f. (Closed) Open Item (455/86041-03(DRS)): This item concerned the incomplete reviews of preoperational tests 2.18.67, 2.18.61, 2.18.60, 2.5.61, and 2.22.16 in that the Quality Assurance (QA) Audits were not reviewed. The inspector has reviewed the QA Audits and Surveillances for each of the tests with no further comments. This item is closed.
- g. (Open) Open Item (455/86041-07(DRS)): This item concerned the acceptability of the high speed capacity of the Reactor Containment Fan Coolers (RCFCs) during preoperational test VP 93.61, "Containment Ventilation." Project Engineering Department (PED) deferred their approval and would verify acceptability after performance of startup test 2.93.80, "Heat Capacity Verification for Primary Containment

System." Upon reviewing the startup tests results, PED required additional data be recorded over a six month period for PED to evaluate. This item will remain open pending the receipt of the PED evaluation and review by the inspector.

- h. (Closed) Open Item (455/86041-10(DRS)): This item concerned the setpoint drift of the pressure switches for the Main Steam Isolation Valve accumulators. The licensee has increased the calibration frequency from 208 weeks to 72 weeks. In addition, AIR 88-0032 was initiated to review operational data on the switches as it becomes available. This review will be used to determine if an increased calibration frequency is warranted or if replacement by a different type switch is needed. The inspector has no further concerns on this subject. This item is closed.
- i. (Closed) Open Item (455/86041-11(DRS)): This item concerned the completion of numerous preoperational tests. Inspection report 455/87003 closed a portion of the item, however, the following tests were still required to be verified complete:

- VA 84.60, "Auxiliary Building Ventilation"
- SX 76.60, "Essential Service Water"
- PS 61.60, "Primary Process Sampling"

The inspector has reviewed VA 84.62, "Fuel Handling Building Pressure Test," along with the above mentioned tests with no additional comments. This item is closed.

- j. (Closed) Open Item (455/86041-12(DRS)): This item concerned two comments to startup test 2.47.80, "Isothermal Temperature Coefficient," which are as follows: (1) the two strip chart recorders referenced in the Initial Conditions steps 7.2.2 and 7.2.3, incorrectly listed the data to be recorded; and (2) 10 CFR 50.59 evaluation incorrectly stated that "All rods are above their rod insertion limits." Test Change Request (TCR) #1 was issued to delete the incorrect reference listed in (1) above and the rod insertion limits mentioned on the 10 CFR 50.59 evaluation. The inspector has no further concerns and this item is closed.
- k. (Closed) Open Item (455/86041-13(DRS)): This item concerned startup test 2.47.81, "Power Coefficient Determination," in that the procedure did not address the impact of boron concentration changes on the test results. The licensee issued TCR #1 which added a statement to verify final boron concentrations were within 10 ppm of the initial boron concentrations. This change was adequate to address the concern and this item is closed.
- l. (Closed) Open Item (455/87014-01): This item concerned startup test results that had been reviewed by the inspectors, but had not been approved by PED. PED has approved the test results and the inspectors have completed their reviews with no further comments. This item is closed.

- m. (Closed) Open Item (455/87014-02): This item concerned Test Review Board (TRB) comment #9 to startup test 2.32.83, "Initial Criticality Sequence," in that a 10 CFR 50.59 review for a Test Change Request (TCR) needed to be clarified, but did not specify which TCR was in question (test included nine TCRs). A PED memo dated July 21, 1987, from D. Elias to R. E. Querio and E. E. Fitzpatrick, indicated that TCR #2 should have been referenced in the TRB comment. The inspector has no further concerns and this item is closed.
- n. (Closed) Open Item (455/87014-03): This item concerned three issues identified in startup test 2.45.81, "Incore Flux Mapping at Low Power": (1) greater than 25E-6 amperes not reached on all incore detectors; (2) computer constants not reverified after each pass of the incore detectors; and (3) system test engineer concluded that the operability of the Incore System was not demonstrated. The three concerns were resolved as follows:
- (1) Both PED and Westinghouse concluded that the detector amperage obtained was inconsequential when taking the flux map. Reactor power could not be increased to achieve the required amperage without violating the power range requirements of sequence document 2.32.83, "Initial Criticality Sequence."
 - (2) The computer normalization factor was set once and was not a variable during the flux map. The procedure did not specifically address reverifying the normalization after each pass.
 - (3) Seven flux maps have been satisfactorily taken as a part of the operating surveillance program after completion of this test. PED concluded that these flux maps verify system operability.
- The inspector has reviewed the resolutions and has no further concerns. This item is closed.
- o. (Closed) Open Item (455/87014-04): This item concerned startup test 2.47.80, "Isothermal Temperature Coefficient Determination (CBD In)," which allowed the measurement of the isothermal temperature coefficient of reactivity to be performed with a three degree change in reactor coolant temperature, while FSAR Table 14.2-77 required a five degree change. The inspector requested the licensee to revise the FSAR requirements. The licensee has updated the FSAR with Amendment 48 which incorporated the requirement to three degrees. This item is closed.
- p. (Closed) Open Item (455/87014-06): This item concerned startup test 2.64.85, "Rod Drop Time Measurement Test," which did not specify acceptance criteria for rod drop times initially found to be outside the upper and lower two sigma limit. Since the Byron startup tests have been completed and the results accepted for the acceptance criteria described above, this item is not applicable. However, the concern is applicable to Braidwood. Open item (456/87025-07) tracks the resolution for Unit 1, while the Unit 2 test has incorporated the acceptance criteria. As such, this item is closed.

- q. (Closed) Unresolved Item (455/87014-07): This item concerned the proper operation of the decelerating devices (i.e., the dash pot region) which was not specifically addressed in startup test 2.64.85. The test did record the times the rod entered the dash pot region and contact at the bottom of the dash pot region in Appendix C, Table A. The data was consistent among the 53 rod drops. A letter from D. Elias to R. Querio, dated January 4, 1988, stated that although the acceptability of the decelerating devices was not specifically addressed in the PED approval letter, the procedure reviewer had reviewed the data indicating no gross anomalies. Since the decelerating devices were verified acceptable by PED, the inspector has no further concerns. This item is closed.
- r. (Closed) Open Item (455/87014-08): This item concerned a conflict between FSAR Section 3.9.2.1 and Safety Evaluation Report (SER) Section 3.9.2.1 requirements for allowable piping stress values. Resolution of the licensee's test program in this area had been accomplished in NRC Inspection Report 50-455/86030 by closing SER item 455/83000-13. Background information was obtained from a letter from E. C. Rodabaugh (NRC consultant) to J. R. Rajan (Mechanical Engineering Branch, NRC) dated July 6, 1982, concerning the acceptable steady-state vibration piping stress. This item is closed.
- s. (Closed) Unresolved Item (455/87014-09): This item concerned startup test 2.52.85D, "Nuclear Instrumentation System Calibration," which deleted Test Section 9.10, "Deviation Alarm Circuitry Check," and added an Initial Condition to Section 7.4 to verify the deviation instrument drawer (2NY-8050) was calibrated. Although the test was performed in January 1987, Section 7.4 indicated that 2NY-8050 had not been calibrated since December 16, 1985, by BIP 2400-33. The licensee has stated that the BIP had been performed on November 12, 1986, and that the date indicated in the test was in error. The inspector has reviewed the BIP and concluded that since the deviation instrument drawer had been calibrated within two months of the test performance, the intent of the test had been satisfied. This item is closed.
- t. (Closed) Open Item (455/87014-11): This item concerned the test results of IT 47.81, "Power Coefficient Determination" (75% power), in that the load swings performed on the turbine were less than the 47 MW required by the procedure. The smaller load swings were obtained due to the turbine being in manual, while previous test performances had the turbine in automatic. The smaller load swings produced smaller changes in temperatures, enthalpies, etc. The test results were not as accurate as they would have been if larger load swings were obtained; however, PED concluded that the test results had sufficient margin to be acceptable. The test was performed at other power levels with acceptable results. This item is closed.

2. Startup Test Results Evaluation

The inspectors reviewed the results of the following startup test procedure to verify all test changes were identified and approved in accordance with administrative procedures; all test deficiencies were appropriately resolved, reviewed by management and retested 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; and test results were approved by appropriate personnel:

Initial Core Load Test Sequence

2.52.81A "Core Loading Instrumentation" (High Voltage/Discriminator/Neutron Check)

Post Core Load Pre-Critical Test Sequence

2.32.81 "Post Core Loading Precritical Test Sequence"
2.63.80 "RTD Bypass Loop Flow Verification"
2.63.81A "Reactor Coolant System Flow Measurement (Hot Standby)"
2.45.80 "Incore Flux Mapping System Checkout"
2.47.83 "Incore Thermocouple (Core Exit Thermocouples-CET)"
2.34.83A "Main Feedwater-Water Hammer Prevention System (0% Power)"

Initial Criticality and Low Power Test Sequence

2.64.80A "Bank Worth Measurement at Zero Power" (CBA, CBB, CBC, CBD, SBA & SBB, SBC, and SBD/SBE)
2.52.83 "Determination of Core Power Range for Low Power Physics Testing"
2.52.84 "Reactivity Computer Checkout"
2.64.80B "Bank Worth with Overlap Measurement at Zero Power"

30% Power Test Sequence

2.63.81B "Reactor Coolant System Flow Measurement" (30%)
2.80.83 "Test Sequence at 30% Power"
2.34.80A "Steam Generator Level Controller Response at 3-6% Power"
2.34.83B "Main Feedwater - Water Hammer Prevention System (100% Power)"
2.34.80B "Steam Generator Level Controller Response at 20% Power"

50% Power Test Sequence

2.80.84 "Test Sequence at 50% Power"
2.63.81B "Reactor Coolant System Flow Measurement" (50%)
2.34.80D "Steam Generator Level Controller Response at Power Levels above 40%"
2.34.80C "Steam Generator Level Controller Response at 30% Power"

75% Power Test Sequence

2.80.80 "Test Sequence at 75% Power"
2.63.81B "Reactor Coolant System Flow Measurement" (75%)
2.34.80D "Steam Generator Level Controller Response at Power Levels above 40%"

90% Power Test Sequence

2.80.81 "Test Sequence at 90% Power"
2.63.81B "Reactor Coolant System Flow Measurement" (90%)
2.47.82D "Thermal Power Measurement and Statepoint Data Collection" (90% Power)

100% Power Test Sequence

2.80.82 "Test Sequence at 100% Power"
2.63.81B "Reactor Coolant System Flow Measurement"
2.52.86B "Axial Flux Difference Adjustment at 100% Power"
2.52.85F "Operational Alignment of Excore Nuclear Instrumentation"
2.52.85E "Operational Alignment of Excore Nuclear Instrumentation (Full Power)"
2.47.82B "Thermal Power Measurement and Statepoint Data Collection (Full Power)"
2.47.82E "Thermal Power Measurement and Statepoint Data Collection (100% Power)"
2.34.80D "Steam Generator Level Controller Response at Power Levels Above 40%"
2.64.89 "Large Load Reduction"
2.52.88 "Full Power Plant Trip"

The inspectors concerns in this area were properly addressed by the licensee during the inspection.

No violations or deviations were identified.

3. Startup Test Results Verification

The inspectors reviewed the following startup test procedures and verified that results were reviewed against approved acceptance criteria and an evaluation of the test results had been performed in accordance with Regulatory Guide 1.68 and the licensee's Startup Manual:

Initial Core Load Test Sequence

2.61.80 "Reactor Systems Chemical Sampling for Core Load"
2.61.81 "Radiation Surveys Prior to Core Loading"

Post Core Load Pre-Critical Test Sequence

- 2.86.80 "Heat Capacity Verification for Diesel Generator Ventilation"
- 2.64.81 "Control Rod Drive Mechanism Operational Test"
- 2.64.82 "Rod Control System Checkout"
- 2.61.82 "Chemistry and Radiochemistry Criteria for Monitoring Water Quality During Startup and Power Ascension" (Modes 5 and 3)

Initial Criticality and Low Power Test Sequence

- 2.133.80B "Reactor Loose Parts Monitor (0% Power)"
- 2.61.82 "Chemistry and Radiochemistry Criteria for Monitoring Water Quality During Startup and Power Ascension" (Mode 2)
- 2.34.81 "Calibration of Steam and Feedwater Flow"

30% Power Test Sequence

- 2.133.80B "Reactor Loose Parts Monitor (30% Power)"
- 2.61.82 "Chemistry and Radiochemistry Criteria for Monitoring Water Quality During Startup and Power Ascension" (30% Power)
- 2.61.83 "Radiation Surveys During Power Ascension (3 to 10%)"
- 2.61.84 "Process and Effluent Monitors and Failed Fuel Monitor Checks" (5 and 30%)
- 2.99.80 "Heat Capacity Verification for Switchgear Heat Removal Ventilation System"
- 2.128.80 "Heat Capacity Verification for Miscellaneous Electrical Equipment Room Ventilation"
- 2.34.81 "Calibration of Steam and Feedwater Flow"

50% Power Test Sequence

- 2.133.80B "Reactor Loose Parts Monitor (50% Power)"
- 2.61.82 "Chemistry and Radiochemistry Criteria for Monitoring Water Quality During Startup and Power Ascension" (50% Power)
- 2.61.83 "Radiation Surveys During Power Ascension (48-52%)"
- 2.34.81 "Calibration of Steam and Feedwater Flow"

75% Power Test Sequence

- 2.133.80B "Reactor Loose Parts Monitor (75% Power)"
- 2.61.82 "Chemistry and Radiochemistry Criteria for Monitoring Water Quality During Startup and Power Ascension" (75% Power)
- 2.34.81 "Calibration of Steam and Feedwater Flow"

90% Power Test Sequence

- 2.133.80B "Reactor Loose Parts Monitor (90% Power)"
- 2.34.81 "Calibration of Steam and Feedwater Flow"

100% Power Test Sequence

2.133.80B	"Reactor Loose Parts Monitor (100% Power)"
2.61.82	"Chemistry and Radiochemistry Criteria for Monitoring Water Quality During Startup and Power Ascension" (100% Power)
2.61.82	"Radiation Surveys During Power Ascension (90-100% Power)"
2.61.84	"Process and Effluent Monitors and Failed Fuel Monitor Checks" (100%)
2.18.80	"Degassing the Reactor Coolant System"
2.84.80	"Heat Capacity Verification for Auxiliary Building Ventilation"
2.34.81	"Calibration of Steam and Feedwater Flow"
2.52.87	"10% Load Swing Test"
2.28.80C	"Pipe Vibration"

The inspectors had the following comments:

- a. With respect to 2.61.84, the inspector noted a conflict in the channels description stated in the test and Table 11.5-1 of the FSAR for radiation detectors 1RE-PRO28A-E and 2RE-PRO28A-E. In addition, the table did not list 2RE-PRO28D-E. In reviewing Table 11.5-1, the licensee agreed that the channels descriptions did not coincide with the proper detectors and the 2RE-PRO28D-E detector had been omitted. The licensee intends to update the FSAR to correct the discrepancies. The inspector has no further concerns.
- b. With respect to 2.128.80, the inspector noted that the measured flow for fan 2VE01C was only 70% of design. When the data was plotted on the fan curve, it indicated that the fan was operating in an unstable region. PED requested further performance data be taken to verify that the fan would operate in a stable region. Although PED requested this data on October 29, 1987, an AIR (455-225-88-0058) was not initiated until March 17, 1988. The timeliness of the response appears inappropriate due to the possibility of the fan operating in an unstable condition. The licensee has stated that the required testing cannot be performed to provide the necessary data until outside air temperature increases. This will be considered an open item (455/88004-01) pending the results of the fan performance data and review by the inspector.

No violations or deviations were identified.

4. Open Items

Open items are matters which have been discussed with the licensee, which will be reviewed by the inspector and which involve some action on the part of the NRC or licensee or both. Open items disclosed during the inspection is discussed in Paragraph 3.b.

5. Exit Interview

The inspectors met with licensee and contractor representatives denoted in Paragraph 1 during and at the conclusion of the inspection on March 17, 1988. The inspectors summarized the scope and results of the inspection and discussed the likely content of this inspection report. The inspectors concluded that the licensee had adequately reviewed and properly addressed concerns identified during testing. The licensee acknowledged the information and did not indicate that any of the information disclosed during the inspection could be considered proprietary in nature.