U. S. NUCLEAR REGULATORY COMMISSION

REGION III

Reports No. 50-456/87041(DRS); 50-457/87039(DRS)

Docket Nos. 50-456; 50-457 Licenses No. NPF-72; CPPR-133/NPF-75

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

Facility Name: Braidwood Station, Units 1 and 2

Inspection At: Braidwood Site, Braidwood, Illinois

Inspection Conducted: October 26, 1987 through January 12, 1988

Inspectors: A. Dunlop, Jr. Andrew Dunlop Jr. 2-3-88
Lead Inspector Date

S. Stasek Andrew Dunlop Jr. for 2-3-88
Date

R. Mendez Andrew Dunlop Jr. for 2-3-88
Date

P. R. Rescheske Andrew Dunlop Jr. for 2-3-88
Date

B. A. Azab Beth A. Azab 2/3/88
Date

Approved By: Monte P. Phillips, Chief 2/3/88
Operational Programs Section Date

Inspection Summary

Inspection on October 26, 1987 through January 12, 1988 (Reports No. 50-456/87041(DRS); 50-457/87039(DRS))
Areas Inspected: Routine, unannounced safety inspection to review actions on previous inspection items (92701); preoperational test performance (70312, 70317, 70434); preoperational test results review (70320, 70322, 70325, 70534, 70538, 70539, 70547, 70535, 70537, 70548, 70324); preoperational test results

verification (70329); initial startup test program (72400); startup test procedure review (72570, 72572, 72576, 72500, 72566, 72583, 72582, 72580, 72564, 72300, 72578); startup test results review (72596, 72600, 72301); and startup test results verification (72301, 72596).

Results: Of the eight areas inspected, no violations were found in three areas, five violations were found in the remaining five areas: failure to perform troubleshooting with an adequate procedure (Paragraph 2.a); failure to initiate deficiencies in a timely manner (Paragraphs 4.g.(1), 5.f, and 9.a.(1)); failure to perform a safety evaluation in a timely manner (Paragraph 4.b); inadequate review of test procedures (Paragraphs 5.i and 7.a); and failure to notify the NRC per the operating license (Paragraph 9.b). A notice of violation will not be issued regarding the untimely safety evaluation due to the licensee meeting the requirements of 10 CFR 2, Appendix C, Section V.A. In addition, one unresolved item was identified concerning the testing of deviation alarms (Paragraph 9.a(3)).

DETAILS

1. Persons Contacted

Commonwealth Edison Company (CECo)

*L. E. Davis, Assistant Superintendent - Technical Services
*D. E. O'Brien, Station Services Superintendent
*M. E. Lohmann, Startup Superintendent
P. L. Barnes, Regulatory Assurance Supervisor
*E. W. Carroll, Regulatory Assurance
*M. Takaki, Regulatory Assurance
T. W. Simpkin, Regulatory Assurance
*T. J. Lewis, Startup Staff, NOVA
M. S. Inserra, Test Review Board (TRB) Supervisor/Project Startup Group (PSG)
*B. L. Palowitch, Startup Testing Supervisor
D. S. Ewan, System Test Engineer
R. C. Bedford, Regulatory Assurance
*R. D. Kyrouac, Quality Assurance Superintendent
*E. Steckhan, Quality Assurance
A. J. Baker, System Test Engineer
J. A. Bauer, TRB Coordinator
S. J. Foley, TRB Member/PSG
*P. Fay, PSG NSSS Supervisor
*L. Kline, Regulatory Assurance
T. D. Weis, Project Engineering Department (PED)
D. Christiana, PED
M. L. Tumick, PED
*W. Parish, TRB Supervisor/PSG
*D. Kapinus, Assistant Tech Staff Supervisor

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

*Denotes those attending the exit meeting on January 12, 1988.

2. Action on Previous Inspection Items

a. (Closed) Unresolved Item (457/87021-02): This item involved an apparent lack of communications between the System Test Engineer (STE) and Nuclear Station Operator (NSO) which resulted in depressurization of the reactor coolant system. The inspectors requested that the licensee provide more information on the circumstances leading up to the opening of the valve. Upon further review, this item has been escalated to a violation.

On July 2, 1987, the licensee was performing preoperational test BwPT RC-50 with reactor coolant pressure at approximately 360 psig and temperature of 175°F. The STE in charge of clearing deficiencies 112 and 113 to BwPT RY-50, opened pressurizer power

operated relief valve (PORV) 455A which caused the reactor coolant system to depressurize. The STE was not aware that block valve 2RY8000A to PORV 455A was in the open position. The NSO on duty tripped reactor coolant pumps 2C and 2D due to low pump seal differential pressure. After a review of operating procedures the licensee commenced a cooldown to below 140°F so that the RCP's could be restarted.

At the inspector's request, the licensee investigated the above circumstances and issued a report on the events leading to the opening of PORV 455A. The licensee found that the STE assumed that PORV block valve 2RY8000A was closed from previous testing and never reverified the position prior to stroking the PORV. Additionally, the STE did not specify during the shift briefing that the PORVs were to be tested, nor did the STE notify the control room immediately prior to stroking valve 2RY455A. This failure by the licensee to perform troubleshooting with an appropriate procedure is considered a violation (457/87039-01(DRS)).

The licensee held a staff meeting with the STEs to discuss the importance of verifying changes to plant conditions and to notify control room and shift personnel prior to entering a test. Additionally, STEs were briefed on the need to exercise additional caution to ensure that systems were properly aligned. Due to the corrective action taken by the licensee, the above violation does not require a response.

b. (Closed) IE Bulletin 80-06 and Safety Evaluation Report 457/860008: These items concerned Engineered Safety Feature (ESF) Reset Controls. The inspector reviewed BwPT EF-50 and Retest 37, "Unit Two Engineered Safety Features," and BwPT EF-51, "ECCS Full Flow," to verify that components that started or changed position on an ESF signal would remain in that condition after the ESF actuating signal was removed. This item is considered closed.

c. (Open) Open Item (456/87025-01(DRS)): This item concerned startup test results packages that required PED approval. The following tests have been approved and subsequently reviewed by the inspector with no additional comments:

BwSU FH-30, "Initial Core Load Sequence"
BwSU RC-32, "Reactor Coolant Flow Coastdown"
BwSU RD-31, "Rod Control System Checkout"
BwSU RY-30, "Pressurizer Sprays, Heaters, and Bypass Flow Adjustments"

This item will remain open pending PED approval and review by the inspector of the remaining startup tests listed in the item.

d. (Closed) Open Item (457/87021-06(DRS)): This item concerned preoperational test BwPT EF-51 and a licensee identified deficiency on failure to prove Test Acceptance Criterion 4.4. This acceptance criterion was written to ensure that the 2B diesel-driven auxiliary

feedwater (AFW) pump would start and obtain rated pressure in 60 seconds on a Safety Injection signal. To track resolution of this item, Action Item Record (AIR) R20-87-095 was initiated on May 19, 1987. Subsequently, the subject acceptance criterion was verified during performance of preoperational test BwPT EF-50, Section 9.54, and the AIR closed. The inspector reviewed both the completed AIR and BwPT EF-50 and concluded that the acceptance criterion had been properly met with a starting response, as tested, of 4.75 seconds. This item is considered closed.

e. (Closed) Open Item (457/87021-08(DRS)): This item concerned the review of test results package for BwPT RH-50, "Residual Heat Removal." The licensee has approved the test results and the inspector has reviewed the completed package with no additional comments. This item is considered closed.

f. (Closed) Open Item (457/87031-01(DRS)): This item concerned the review of test results package for BwPT RY-57 and Retest RY-50-21, "Pressurizer." The licensee has approved the test results and the inspector has reviewed the completed packages with no additional comments. This item is considered closed.

g. (Closed) Open Item (457/87031-03(DRS)): This item concerned the review of test results package for BwPT SI-53, "Safety Injection Check Valve Operability and Leakage Test (IHF)." The licensee has approved the test results and the inspector has reviewed the completed package with no additional comments. This item is considered closed.

h. (Closed) Open Item (457/87031-05(DRS)): This item concerned Test Deficiency MS-52-46 which was initiated to document a required changeout of M/A station instrument 2PK-MS044B on the remote shutdown panel. Additionally, at the time of the inspector's review, the test results for the associated preoperational test (BwPT MS-52) had not received final approval from the Project Engineering Department (PED). Subsequently, the test results were approved by the licensee, and thereafter, were reviewed by the inspector. The test deficiency was verified as work complete, the proper model instrument had been installed and tested, and the deficiency appropriately closed. This item is considered closed.

i. (Closed) Open Item (457/87031-06(DRS)): This item concerned the review of test results package for BwPT FW-58, "Steam Generator Level Alarm and Setpoint Verification (IHF)." The licensee has approved the test results and the inspector has reviewed the completed package with no additional comments. This item is considered closed.

j. (Closed) Open Item (457/87031-07(DRS)): This item concerned the review of test results package for BwPT MS-57, "Main Steam, Safety-Related (IHF)." The licensee has approved the test results and the inspector has reviewed the completed package with no additional comments. This item is considered closed.

k. (Closed) Open Item (457/87031-08(DRS)): This item concerned the review of test results package for BwPT MS-50, "Main Steam Isolation Valves." The licensee has approved the test results and the inspector has reviewed the completed package with no additional comments. This item is considered closed.

l. (Closed) Open Item (457/87031-09(DRS)): This item concerned the review of test results package for BwPT SI-50, "Safety Injection." The licensee has approved the test results and the inspector has reviewed the completed package with no additional comments. This item is considered closed.

m. (Closed) Open Item (457/87031-10(DRS)): This item concerned the review of test results package for BwPT FW-57, "Tempering Flow Test (IHF)." The licensee has approved the test results and the inspector has reviewed the completed package with no additional comments. This item is considered closed.

n. (Closed) Open Item (457/87031-11(DRS)): This item concerned the review of test result packages BwPT VA-50 and Component Demo #17, "Auxiliary Building Ventilation Cubicle Coolers." The licensee has approved the test results and the inspector has reviewed the completed packages. The air flow rates for the cubicle coolers exceeded the required flow rates, which should provide additional cooling capability to the cubicles. As such, this is not deemed a concern. Additionally, air flows will be remeasured during BwSU VA-70, "VA Heat Capacity," when the ventilation design will be verified. This item is considered closed.

o. (Closed) Open Item (457/87031-12(DRS)): This item concerned the performance and test results review of BwPT SX-50, Retest 10, "Essential Service Water," to ensure that adequate essential service water (ESW) flow is available to certain components which were not met during the initial ESW test. The test has been performed and approved by the licensee. The inspector has the following comment. In five cases, the ESW flow again did not meet their expected values: ESW 2A and 2B Oil Cooler (actual 3.9 and 4 gpm; required 10 gpm), Safety Injection (SI) 2A and 2B Bearing Oil Cooler (actual 42.3 and 34.4 gpm; required 45 gpm), and Unit 2 Component Cooling (CC) Heat Exchanger (actual 15,000 gpm; required 16,000 gpm). Per pump vendor Bingham Willamette to Sargent & Lundy (S&L) letter, dated September 30, 1986; the minimum acceptable cooling flow to ESW Oil Coolers is 0.5 - 3.0 gpm which was obtained from actual operating experience at Byron 1. Per Westinghouse comments to Byron ESW test, the minimum required flow to the SI Bearing Oil Coolers is 26-33 gpm. The flow obtained during testing met these minimum flow requirements, and as such, is acceptable. The flow to the CC Heat Exchanger is addressed in Paragraph 5.a of this report. This item is considered closed.

p. (Closed) Open Item (457/87031-13(DRS)): This item concerned the review of test results packages for BwPT VD-50, LM-57, IP-50, and CS-50. The licensee has approved the test results and the inspector has reviewed the completed packages with no additional comments except for BwPT CS-50, which is addressed in the following paragraph. This item is considered closed.

q. (Closed) Unresolved Item (456/87032-02(DRS); 457/87031-14(DRS)): This item concerned the justification for incorporating an instrument flow orifice correction factor during the performance of preoperational test BwPT CS-50 to convert measured demineralized water flowrate to an equivalent 30% NaOH solution flowrate. The inspector subsequently reviewed the licensee's basis documents including Sargent & Lundy (S&L) Calculation CS-RS-83 addressing the subject methodology and found them acceptable.

However, during subsequent review of the approved package, the inspector noted that Westinghouse Electric Corporation, during their review of the test results package, indicated that containment pH levels could become greater than the ANSI/ANS recommended limit of 11.0 under certain conditions following an actuation of the containment spray system. Subsequently, in a memo dated October 26, 1987, which provided final approval of the test results by the Project Engineering Department (PED), PED documented their disagreement with the Westinghouse conclusion, and based upon a S&L calculation (CS-RS-83), determined that pH levels would remain within the acceptable range at all times. However, when the inspector requested a copy of the referenced S&L calculation, the licensee found that it addressed a separate issue. Subsequently, PED prepared a new calculation (based upon a S&L calculation performed in response to NRC question 22.25 as documented in the FSAR) addressing the maximum pH issue and determined that under the most severe conditions, a maximum pH of 10.2 would occur. The inspector reviewed the PED calculation and since the value appeared to be appropriately derived and was less than the 11.0 limit, no further concerns exist in this area. This item is considered closed.

r. (Closed) Open Item (457/87031-15(DRS)): This item concerned preoperational tests BwPT DG-50 and BwPT DG-51 and associated test deficiencies DG-50-107, DG-51-76, DG-51-79, DG-51-80, and DG-51-83 which had not been completed at the time of the inspector's initial review. Subsequently, the above test deficiencies were resolved, appropriate retests performed, and BwPT DG-50 and BwPT DG-51 received final approval by the licensee. The inspector, thereafter, reviewed the completed test and retest packages, including licensee followup actions on the subject test deficiencies, with no further comments. This item is considered closed.

s. (Closed) 10 CFR Part 21 Report (457/850022-PP): Failure of Parker-Hannafin air line check valves to seat on slow bleedoff of supply air. The inspector reviewed the licensee's response and verified that the air line check valves were replaced with stainless

steel valves of improved design. The licensee has successfully tested these valves in BwPT MS-50, "Main Steam Isolation Valves," and Retest 19. In addition, BwVS 800-8, Revision 0, "Main Steam Isolation Valve Instrument Air Check Valve Leakage Test," will be performed semi-annually until the valves are proven to be reliable. This item is considered closed.

One violation was identified in Paragraph 2.a for failure to use an appropriate procedure.

3. Preoperational Test Performance

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

BwPT RP-50, "Reactor Protection Time Response"
BwPT RP-53, "Reactor Protection Logic"
BwPT EF-52, "EF Logic and Time Response"

No violations or deviations were identified.

4. Preoperational Test Results Evaluation

The inspectors reviewed the results of the following preoperational test procedures 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, as necessary; test packages were reviewed by QA for adequacy of contents; and test results were approved by appropriate personnel.

BwPT RY-50, Revision 0 and Re t 21, "Reactor Coolant Pressurizer"

BwPT RP-52, Revision 0, "Reactor Protection Turbine Runback"

BwPT CV-57, Revision 0, "Chemical Volume Control System (IHF)"

BwPT SI-52, Revision 0, "Safety Injection"

BwPT CC-50, Revision 0, "Component Cooling"

BwPT RP-51, Revision 0, "Reactor Protection and Engineered Safeguards Logic Test"

BwPT EF-50, Revision 1 and Retest 37, "Unit Two Engineered Safety Features"

BwPT AF-50, Revision 1, "Auxiliary Feedwater"

BwPT RC-50, Revision 0, "Integrated Hot Functional Unit 2"

BwPT EF-52, Revision 0, "EF Logic and Time Response"

BwPT VP-51, Revision 0, "Containment Ventilation"

BwPT FW-50, Revision 0, "Main Feedwater"

BwPT RP-53, Revision 0, "Reactor Protection Logic"

BwPT RP-50, Revision 0 and Retest 30, "Reactor Protection Time Response"

The inspectors have the following comments with respect to these procedures:

a. With respect to BwPT SI-52, the inspector noted that the acceptance criteria specified in test section 4.1.2 included a requirement to maintain greater than 78 gpm seal injection flow during determination of total centrifugal charging pump flowrate. BwPT SI-52 accomplished this with an as tested seal injection flow of 78.77 gpm. Technical Specifications surveillance requirement 4.5.2.h.1.b specifies that during determination of total centrifugal charging pump flowrate, a seal injection flow of 80 gpm as an absolute value (± 0 gpm) is required. The inspector subsequently determined that the value obtained during performance of the preoperational test was acceptable "as-is" with the Technical Specification surveillance value as possibly too restrictive. This was brought to the attention of licensee personnel who initiated a review to determine if sufficient need was exhibited to submit a change to the Technical Specifications to incorporate a tolerance around the 80 gpm value. This will remain an open item pending resolution by the licensee (456/87041-01(DRS); 457/87039-02(DRS)).

b. With respect to BWPT CC-50, the inspector noted that Test Change Requests (TCR) TCR-13 and TCR-29 were categorized as major TCRs. As such, safety evaluations should have been performed pursuant to 10 CFR 50.59 prior to the subject test steps being conducted. The Braidwood Startup Manual (BwSUM) required and test section 9.0 specified that all major TCRs were to be accompanied by safety evaluations to ensure no deleterious effect on Unit 1 operation during the performance of Unit 2 preoperational testing. It was subsequently determined that these discrepancies were previously identified (albeit after completion of affected test steps) as part of a Quality Assurance (QA) audit (Report No. 20-87-CC50-1). The audit also identified 14 minor TCRs that required review/approval by a Senior Reactor Operator (SRO) in accordance with the BwSUM but which SRO review/approval was not obtained.

Subsequent to the audit, all required reviews, including the two 10 CFR 50.59 safety evaluations, were obtained and appropriate documentation included in the executed test package. The licensee determined no unreviewed safety question had existed during the performance of the revised test incorporating the TCRs. In response to the QA audit, the STE involved was retrained on BwSUM requirements for Unit 2 testing that could have had an effect on Unit 1 operation. In addition, a change to the affected TCR form was made to document STE review of the affected test change(s) and their effect, if any, on Unit 1.

To date, with the preoperational test program for Unit 2 substantially complete, no recurrence of the subject problem has been identified.

This failure to perform required safety evaluations pursuant to 10 CFR 50.59 in a timely manner is a violation of the preoperational test program and its implementation as required by 10 CFR 50, Appendix B, Criterion XI, "Test Control," (457/87039-03(DRS)). However, this violation meets those tests specified in 10 CFR 2, Appendix C, Section V.A.; consequently no Notice of Violation will be issued, and this matter is considered closed.

c. With respect to BwPT VP-51, it was noted that test acceptance criterion 4.3 was not met for reactor containment fan cooler (RCFC) trains A and B. Specifically, fans 2VP01CA and 2VP01CC exhibited flowrates on low speed of 57,831 cfm and 58,802 cfm respectively, both of which were less than the minimum acceptance criterion (59,000 cfm per fan). The inspector was provided additional documentation which addressed similar situations for Byron Units 1 and 2 and Braidwood Unit 1. Resolution on this matter had been reached earlier by reducing the required flow limits to 54,000 cfm per fan with appropriate documentation ensuring that the accident analysis was not violated utilizing the lower flowrates. Following completion of the NRC's review, the Office of Nuclear Reactor Regulation (NRR), via a letter dated February 6, 1987, from S. Varga (NRR) to D. Farrar (CECo), approved the revised flow limits. Because the lower value had been approved by NRR, the inspector has no further concerns.

d. With respect to BwPT RP-52, Test Objective 3.3 was not met due to the turbine governor valves not closing continuously during the 1.5 seconds of runback. Similar problems had been encountered at Byron and Braidwood 1. Westinghouse was investigating the problems with the Digital Electro-Hydraulic Controller (DEHC) at the other units. AIR R20-87-238 was issued to ensure that resolution of the DEHC problems are incorporated at Braidwood 2.

e. The inspectors noted many areas where the licensee or its contractors perceived the need for changes to the FSAR due to actual plant equipment operational data. Many of these changes were slated to be added after the completion of the Unit 2 startup program. The licensee is currently working on a computerized tracking system at

Braidwood that will compile change requests from not only Braidwood, but Byron and PED as well. To ensure that this system will track the required revisions, the inspector will review the licensee's program, as well as ensure that specific FSAR changes have been incorporated after the completion of the Unit 2 startup program. This will be considered an open item (456/87041-02(DRS); 457/87039-04(DRS)) pending satisfactory completion of the inspector's review.

f. With respect to BwPT CV-57, Acceptance Criterion 4.3 could not be met with the Reactor Makeup Controls in the Auto-Makeup mode. The licensee was tracking this problem via AIR R20-87-217, Deficiencies CV-50-260, 239 and CV-50 Retest 32. Final retest approval had not been accomplished prior to completing this inspection. This is considered an open item (457/87039-05(DRS)) pending satisfactory testing of the Auto-Makeup mode and inspector's review of an approved retest results package.

g. With respect to BwPT RY-50, the inspector had the following comments:

(1) During the post test review, TCR #27 was incorporated to change the range that Power Operated Relief Valve (PORV) 2PCV-455A opened from 2311-2359 psig to 2311-2335 psig on Table 11.8A. This was necessary because Technical Specifications require the PORVs to open prior to 2335 psig. Subsequent to the TCR, the licensee did not realize that following incorporation of the change, computer points P0480 and P0482 were out of their expected range (2337.3 and 2345.7 psig respectively) and therefore, a deficiency was required to be initiated.

In addition, PORV 2PCV-456 had the identical acceptance range (2311-2359 psig), but a TCR was not written to correct the error. If a TCR had been initiated, computer point P0483 would also have exceeded its expected range (2336.7 psig).

Failure to address a deficient condition in a timely manner is an example of a violation (457/87039-06a(DRS)) of 10 CFR 50, Appendix B, Criterion V, as implemented by the BwSUM, Section 6.3.7. (Additional examples of this violation are addressed in Paragraphs 5.f and 9.a(1) of this report.)

(2) Initial condition 7.3.1.3.2 was required for Section 9.3. Although the section was entered on May 26, 1987, Step 7.3.1.3.2 was not performed and was later deleted by TCR #14 on June 8, 1987. This is another example of a violation (457/87021-01) addressed in a previous inspection report. The corrective action from the previous violation had not been in place prior to this occurrence.

Additional examples identified during this inspection are as follows: (1) BwPT CV-50; Section 9.5 entered on March 12, 1987 while initial conditions 7.3.5.3 and 7.3.5.4 were not signed until March 23, 1987; Section 9.7 entered on April 17, 1987 while initial condition 7.3.7.3 was not signed until May 27, 1987; and (2) BwPT EF-50; Section 9.73 entered on April 22, 1987 while prerequisite 6.4.4 was not signed off until April 23, 1987; Sections 9.30 and 9.68 were entered on April 17, 1987 and April 18, 1987 respectively, while prerequisite 6.4.9 was not signed off until April 21, 1987.

One example of a violation was identified in Paragraph 4.g(1) for failure to initiate a deficiency in a timely manner. A second concern in Paragraph 4.b addressed failure to perform a safety evaluation in a timely manner, however, no notice of violation was issued.

5. Preoperational Test Results Verification

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

BwPT PR-51, Revision 0, "Process Radiation Monitoring Loop 1"

BwPT PR-52, Revision 0, "Process Radiation Monitoring Loop 2"

BwPT PR-53, Revision 1, "Process Radiation Monitoring Loop 3"

BwPT PR-54, Revision 1, "Process Radiation Monitoring Loop 4"

BwPT RC-52, Revision 0, "Reactor Coolant (Miscellaneous Controls)"

BwPT FH-51, Revision 1, "Fuel Handling Transfer and Refueling Machine"

BwPT CV-51, Revision 0 and Retest 23, "Chemical Feed and Volume Control-Letdown and Seal Injection Control Test"

BwPT PS-52, Revision 0, "Process Sampling Hydrogen Monitors"

BwPT AR-52, Revision 1, "Area Radiation Monitoring (Loop 2)"

BwPT FH-50, Revision 0 and Component Demo 43, "Fuel Handling Tools"

BwPT AB-50, Revision 0, "Unit 2 Boric Acid Processing"

BwPT VQ-50, Revision 0, "Containment Purge"

BwPT VD-55, Revision 1, "Integrated Diesel Gen Misc Elec and Switch Gear Room Ventilation"

BwPT CV-50, Revision 0, "Chemical Feed and Volume Control-Pumps and Make-Up Control"

BwPT SX-50, Retest 10, "Essential Service Water"

BwPT LD-50, Revision 0, "Leak Detection System"

BwPT EM-50, Revision 1, "Thermal Expansion - Primary Side (EM)"

BwPT AP-50, Revision 0, "Bus Loading and Independency"

BwPT PR-55, Revision 1, "Process Radiation Monitoring Loop 5"

BwPT PS-50, Revision 0 and Component Demonstration 27, "Primary Process Sampling"

BwPT EM-52, Revision 0, "Pipe Vibration"

BwPT AR-51, Revision 1, "Area Radiation Monitoring (Loop 1)"

BwPT HC-50, Revision 0, "Reactor Polar Crane"

BwPT RC-51, Revision 0, "Reactor Coolant (RCP and Loop Stop Valves)"

BwPT LM-50, Revision 1, "Loose Parts Monitoring"

BwPT VP-50, Revision 1, "Primary Containment Ventilation"

BwPT VE-50, Revision 2, "Miscellaneous Electric Room Ventilation"

BwPT VP-52, Revision 0, "Containment Ventilation"

BwPT IT-50, Revision 1, "RTD Cross Calibration - Safety-Related"

BwPT VA-11, Retest 153, "Aux Building Ventilation"

BwPT VX-50, Revision 0, "Switchgear Heat Removal"

BwPT RC-52, Revision 1, "Reactor Vessel Level Indication System (HJJC System) Unit Two"

The inspectors have the following comments with respect to these procedures:

a. With respect to BwPT SX-50, Retest 10, acceptance criterion 4.2 stated that the essential service water flow to the component cooling heat exchanger should be 16,000 gpm. The design minimum for a single train normal cooldown is 18,100 gpm. The actual flow measured in the test was 15,000 gpm. Westinghouse, per letter dated December 9, 1987 (CCE-87-277), J. L. Tain to D. Elias, stated that the flow was adequate for fuel load and low power testing on Unit 2. However, the difference between the 15,000 gpm achieved and the

designed required 18,100 gpm needs to be analyzed for a potential system impact at high power levels. The licensee is tracking this item per AIR R20-87-301. This is considered an open item (457/87039-07(DRS)) pending licensee analysis and review by the inspector.

b. With respect to BwPT VE-50, the inspectors had the following comments:

(1) Deficiency VE-50-38 addressed the setpoint instability of type 7PS Solon differential pressure switches. Four out of six switches were found out of tolerance only two to three months after calibration. This appears to be a generic problem as switches in other systems have also exhibited similar setpoint drifts. Project Engineering Department is currently investigating the problem per AIR R20-87-249. This is considered an open item (457/87039-08(DRS)) pending a resolution to the switch instability.

(2) Deficiency VE-50-2P addressed the incorporation of ECN 36932 for fans 2VE01C, 2VE02C, 2VE03C, and 2VE04C. The testing associated with this ECN will be performed in BwPT VD-55, Retest 29, to ensure the fans will automatically restart when power is restored after a loss-of-offsite power event. This is considered an open item (457/87039-09(DRS)) pending successful completion of the retest and review by the inspector.

c. With respect to BwPT LM-50, Acceptance Criteria 4.1 and 4.2 were not satisfied because the data taken could not be properly evaluated. The data needs to be compared to the background noise frequency response which will be taken by startup test BwSU LM-70, "Reactor Loose Parts Monitor (0%, 30%, 50%, 75%, 90%, 100%)." As such, the licensee will perform the required evaluations as tracked by AIR R20-87-150 after the performance of BwSU LM-70. This is considered an open item (457/87039-10(DRS)) pending inspector's review of the licensee's evaluation.

d. With respect to BwPT VD-55, the acceptance criteria air flows for the following fans were not met. Sargent and Lundy (S&L) performed calculations (VD-100, VD-101, VE-102, VX-104) to provide the minimum fan flows required to maintain adequate room temperatures. The following compare the fans flow rates:

Fan	Acceptance Criteria	Measured Fan Flow	S&L Minimum Fan Flow
2VD01CA	90,000 cfm	85,772 cfm	84,740 cfm
2VD02CA	2,500 cfm	2,482 cfm	2,158 cfm
2VE02C	475 cfm	455 cfm	343 cfm
2VX02C	27,700 cfm	27,581 cfm	18,721 cfm

The licensee intends to revise the flow rates listed in the FSAR from their nominal values to incorporate the measured flows. Since the fans meet S&L minimum fan flow rates, the inspector has no further concerns.

e. With respect to BwPT CV-50 deficiency CV-50-203(M) listed, in the followup action, that the closure times for 2CV8104 were 6.88 (remote) and 9.15 (local) seconds. This deficiency was signed off as acceptable even though the difference between the local and remote time was in excess of the 0.5 seconds (2.27 seconds) requirement of TI-6. The valve was later retimed by Deficiency CV-50-244 for another problem, and acceptable closure times were recorded. Although there is no technical concern, QA needs to ensure that deficiencies are properly resolved as required by the BwSUM, section 4.2.8.

f. With respect to BwPT AB-50, step 9.1.12 required data to be taken for Boric Acid Transfer Pump 2. Although this data was out of the expected range during the performance on January 13, 1987 (discharge pressure 84 psig [65-75 psig expected] and discharge flow rate 90 gpm [115-125 gpm expected]), a deficiency was not initiated until January 30, 1987 after the step was reperformed and the data was again out of tolerance. TRB recognized the fact that deficiencies were not initiated and evaluated the problems; however, this is another example of the violation (457/87039-06b(DRS)) addressed in Paragraph 4.g(1).

g. With respect to BwPT PR-50, stopwatches were used for valve stroke times which were required to be less than five seconds. TI-6 states that stroke times of less than five seconds must be timed with a strip chart recorder. This appears to be of no technical concern as all the valves in question were well within their required stroke time. The TRB has also addressed this concern with the STE.

h. With respect to BwPT VQ-50, the inspector had the following comments:

(1) The acceptance criteria for the Normal Purge Supply and Exhaust Fans were not met. The supply fans were required to provide 40,000 to 44,000 cfm, but only provided 31,279 (2VQ01CA) and 31,414 cfm (2VQ01CB). The exhaust fans were required to provide 43,900 to 48,290 cfm, but only provided 36,672 (2VQ02CA) and 35,208 cfm (2VQ02CB). S&L performed calculations to obtain a 30,000 cfm minimum allowable flow rate for the fans to limit the tritium concentration within the containment below $5.0X10^{-6}$uc/cc of air. Because the measured flows exceed the S&L minimum flow rates and the difference between the exhaust and supply flows is sufficient to keep the containment under negative pressure, the results appear acceptable.

(2) The acceptance criteria for the Mini-Flow Purge Supply and Exhaust Fans were not met. The fans were required to provide 3,000 to 3,300 cfm while 2VQ04C supplies 2,388 cfm and VQ05C

exhausts 2,387 cfm. S&L states that the lower flow rates will only increase the required time necessary before personnel can enter the containment which appears acceptable to the inspector.

i. With respect to BwPT RC-52, Acceptance Criterion 4.4 states that the Residual Heat Removal (RHR) suction isolation valves will not open on high Reactor Coolant System (RCS) pressure (greater than 360 psig). There appears to be several problems in the testing of this interlock.

(1) The steps designated to verify the acceptance criterion, 9.6.8 and 9.6.17, verified that on a decreasing RCS pressure (approximately 650 psig) that the valves will not open by de-energizing relays K455X and K155X. This does not prove that the valves will not be able to be opened at a pressure greater than 360 psig because relays K455X and K155X are the incorrect relays. These relays are for the automatic closure of the RHR suction isolation valves. The correct relays are K454X and K154X.

(2) The test continues (9.6.10 and 9.6.19) to decrease RCS pressure until the correct relays (K454X and K154X) de-energize (approximately 350 psig) and the valves could be opened. These steps prove the interlocks will not reset until RCS pressure is less than 360 psig, although they are not listed as part of the acceptance criterion.

(3) The test (steps 9.6.11.1 and 9.6.20.1) then increases RCS pressure until relays K454X and K154X energize (365 and 355 psig). The test does not prove that the valves will not open with this interlock now energized. In addition, for relay K454X, the pressure is above the 360 psig acceptance criterion. As such, the acceptance criterion was not met.

(4) Technical Specification 4.5.2.d.1(a) states the greater than 360 psig interlock requirement, while Amendment 44 to the FSAR, Section 7.6.4.1, allows an RCS pressure of 400 psig prior to the valves not being allowed to open. In a Westinghouse letter SET-CCE-308A, H. James to M. Engeni, an explanation to the higher pressure limit is described due to wide range pressure transmitter inaccuracies. In addition, the letter recommended a Technical Specification change to the 360 psig setpoint, which does not appear to have been implemented.

(5) The procedure which verifies the above Technical Specification, BwIS 3.3.6-204, also allows pressure to be greater than 360 psig before the interlock exists.

As Westinghouse has shown a higher interlock setpoint (approximately 400 psig) is acceptable, there is not a technical concern with the operation of the interlock. However, a Technical Specification change appears to be appropriate in order for the

interlock to meet Technical Specifications. This will be considered an open item (456/87041-03; 457/87039-11) pending licensee review of the interlock meeting Technical Specifications as written or if a Technical Specification change is required. In addition, the procedure was in error in that it referenced incorrect acceptance criterion steps, and did not adequately test the interlock. This is considered an example of a violation of 10 CFR 50, Appendix B, Criterion VI (457/87039-12a(DRS)). An additional example is addressed in Paragraph 7.a.

j. With respect to BwPT IT-50, the inspector had the following comments:

(1) Subsequent to the performance of the test, thermocouples #17, 19, 24, 27, 38, 41, 42, and 58 were either repaired or replaced. The licensee is tracking the retesting of these thermocouples by AIR R20-87-303. Retesting will be accomplished per BwSU IT-73, "Incore Thermocouple (Core Exit Thermocouple-CET)."

(2) Acceptance Criterion 4.1 was not met for all narrow range RTDs. PED and Westinghouse technical evaluation states that the intent of the acceptance criterion was demonstrated and the RTDs will have final calibration performed after BwSU IT-73.

The inspector has no concerns at this time and will review the BwSU IT-73 test results as part of the startup program.

Two examples of violations were identified: Paragraph 5.f for failure to initiate a deficiency in a timely manner and Paragraph 5.i for an inadequate test procedure.

6. Initial Startup Test Program

The inspectors reviewed administrative controls related to the initial startup program against the requirements of the FSAR, SER, applicable Regulatory Guides and Standards, and portions of 10 CFR 50 in order to verify that appropriate controls were in place in the areas of test organization, administration, document control, test and measuring equipment and performance.

a. It appears the licensee is not performing the reviews of the Unit 1 startup test results in a timely manner. As allowed by NRR, the licensee was only required to have the Test Review Board (TRB) complete their review prior to continuing with the next test sequence. This allowed PED to perform a more in depth review of the results. However, these reviews have taken as long as seven months to complete. The licensee has stated that PED had been concentrating their resources on the Unit 2 preoperational test results and startup test preparations in order to meet Unit 2 licensing. The inspector will continue to monitor startup test result approvals for timeliness to see if subsequent restrictions need to be placed on the Unit 2 startup test sequence.

b. The licensee has approved all the Unit 2 startup tests and complied with Regulatory Guide 1.68 by providing the NRC with a copy of each procedure. The BwSUM has adequate administrative requirements in place. The inspectors will monitor implementation of these requirements throughout the test program.

No violations or deviations were identified.

7. Startup Test Procedure Review

The inspectors reviewed the following startup test procedures against the Final Safety Analysis Report (FSAR), Safety Evaluation Report, applicable Regulatory Guides and Standards, and portions of 10 CFR 50:

BwSU RP-70, "Reactor Protection Logic"

BwSU RD-74B, "Bankworth with Overlap Measurement at Zero Power"

BwSU RD-74A, "Bankworth Measurement at Zero Power"

BwSU FH-70, "Initial Core Load Sequence"

BwSU FH-73, "Initial Core Loading"

BwSU NR-79, "Full Power Plant Trip"

BwSU AP-70, "Loss of Offsite Power"

BwSU RC-75, "Shutdown from Outside the Control Room"

BwSU IC-72C, "Incore Moveable Detector and Thermocouple Mapping at Power (Quarter Core)"

BwSU RY-70, "Pressurizer Sprays, Heaters and Bypass Flow Adjustments"

BwSU IC-71, "Incore Flux Mapping at Low Power"

BwSU IT-70, "Isothermal Temperature Coefficient Measurement"

BwSU IT-71, "Power Coefficient Determination"

BwSU FH-72, "Initial Criticality and Low Power Test Sequence"

BwSU NR-71, "Initial Criticality"

The inspectors have the following comments with respect to these procedures:

a. With respect to BwSU NR-79, the inspector noted that at test step 9.1.16, ACB 1-8 and OCB 7-8 control switches were to be placed in pull-to-lock. Based upon review of the station electrical one-line

diagram (20E-0-4001), it appears the proper switchyard breakers to be placed in pull-to-lock to initiate the intended Unit 2 main generator trip should have been ACB 9-10 and OCB 10-11. Because of the location of ACB 1-8 and OCB 7-8 within the double ring bus configured switchyard, if the test procedure was conducted as written, when test step 9.1.16 was performed and ACB 1-8 and OCB 7-8 tripped, a trip of the Unit 1 main generator would have erroneously resulted.

At the time of the inspector's review, startup test procedure BwSU NR-79 had received all required licensee reviews/approvals including final signoff by the Project Engineering Department. Despite these multiple levels of review, the test procedure, as issued, was inadequate to properly conduct the required test under suitable controlled conditions. This is considered an example of a violation of 10 CFR 50, Appendix B, Criterion VI (457/87039-12b(DRS)). Subsequently, the licensee initiated Test Procedure Open Item (TPOI) #2 to BwSU NR-79, to correct the inaccuracies.

b. With respect to BwSU AP-70, the switchyard breakers listed in section 9.1 were listed with incorrect designations for the type of breaker in question. The following identifies the correct breaker designation with the test's version in parenthesis:

ACB 9-10 (OCB 9-10)
ACB 14-15 (OCB 14-15)
OCB 10-11 (ACB 10-11)
OCB 11-14 (ACB 11-14)

The licensee has initiated a TPOI for BwSU AP-70 to correct the breaker designations. The inspector has no further concerns.

c. With respect to BwSU RD-74A and RD-74B, several initial conditions required the STE to record items in the "SOE" although there is no "SOE" in the procedure. Upon discussion with the licensee, the inspector ascertained the steps should have referenced the Significant Events Log (SEL) and not the "SOE." The licensee has initiated TPOIs for the procedures to correct the reference.

One example of a violation was identified in Paragraph 7.a concerning an inadequate test procedure review.

8. 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

BwSU NR-30B, "Core Loading Instrumentation (Neutron Check During Core Loading)"

No violations or deviations were identified.

9. 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:

Post Core Load Pre-Critical Test Sequence

BwSU RD-30, "Control Rod Drive Mechanism Operational Test"

BwSU PI-30, "PI System Checkout"

a. With respect to BwSU PI-30, the inspectors had the following comments:

(1) Appendix A2, step A1.40, obtained a value of 14.92 VDC for the PS2 power supply which had an expected range of -15.00 ± .30 VDC. Although the recorded value during the test on December 6, 1986 was outside the expected range, deficiency 3V1 was not written until April 29, 1987 during the post-test review. This is a further example of a violation of the BwSUM (456/87041-04(DRS)) whereby the deficiency was not written by the end of the testing day.

(2) Deficiency 3V1 determined that the test procedure was incorrect as the expected value should have been a positive value (+ 15.00 ± .30 VDC) as stated on Westinghouse drawing 1055E44, Sheet 1, Revision H. The expected value in the test came from the Westinghouse Technical Manual which was incorrect. Upon further review by the inspector, it was noted that Byron Unit 1 startup test 2.59.30 had deficiency A initiated for the same problem. Although the Braidwood test used the Byron test as a reference, and the licensee has a lessons learned program to use past experience in writing tests, in this case, it was not effective as the procedure was approved for use with an incorrect expected value that had been previously identified. Although this appears to be an isolated example, the inspector will continue to review procedures for incorporation of lessons learned.

(3) AIR R20-87-072 was initiated to evaluate if testing was needed to be performed on the DRPI versus DRPI deviation alarm for rods in the same bank. PED responded that no testing was required because FSAR Table 14.2-64, Acceptance Criteria Section, only addresses FSAR Section 7.7.1.3.2, which has no mention of deviation alarms. However, the Test Summary section of Table 14.2-64 does mention testing of deviation alarms. Deviation alarms are addressed in Section 7.7.1.3.4 of the FSAR. This will be considered an unresolved item (456/87041-05(DRS); 457/87039-13(DRS)) pending additional information from the licensee as to the testing of this alarm.

b. With respect to BwST RD-30, the test was to be performed under no flow conditions (all pumps off) as described in Table 14.2-63 of the FSAR. TCR #4 to the test allowed one Reactor Coolant pump to be operated during the test which was a deviation from the Initial Startup Test Program. The operating license requires the licensee to notify the NRC of any change to the Startup Test Program within one month. The TCR was written on January 13, 1987 and the test performed between January 14, 1987 and January 17, 1987. The NRC was notified by letter; S. C. Hunsader to T. E. Murley, dated July 22, 1987. This does not meet the one month requirement identified in the Operating License NPF-72, Section 2.C.(4), and as such, is considered a violation (456/87041-06(DRS)).

Two examples of violations were identified: Paragraph 9.a(1) for failure to initiate a deficiency in a timely manner and Paragraph 9.b for failure to notify the NRC in the specified time. In addition, Paragraph 9.a(3) addresses an unresolved item concerning an apparent testing inadequacy.

10. 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 are discussed in Paragraphs 4.a, 4.e, 4.f, 5.a, 5.b.(1), 5.b.(2), 5.c., and 5.i.

11. Unresolved Items

Unresolved items are matters about which more information is required in order to ascertain whether they are acceptable items, violations, or deviations. An unresolved item disclosed during the inspection is discussed in Paragraph 9.a.(3).

12. Violations for Which a "Notice of Violation" Will Not be Issued

The NRC uses the Notice of Violation as a standard method for formalizing the existence of a violation of a legally binding requirement. However, because the NRC wants to encourage and support licensees' initiatives for self-identification and correction of problems, the NRC will not

generally issue a Notice of Violation for a violation that meets the tests of 10 CFR 2, Appendix C, Section V.A. These tests are: (1) the violation was identified by the licensee; (2) the violation would be categorized as Severity Level IV or V; (3) the violation was reported to the NRC, if required; (4) the violation will be corrected, including measures to prevent recurrence, within a reasonable time period; and (5) it was not a violation that could reasonable be expected to have been prevented by the licensee's corrective action for a previous violation.

A violation of regulatory requirements identified during the inspection for which a Notice of Violation will not be issued is discussed in Paragraph 4.b.

13. Exit Interview

The inspectors met with licensee and contractor representatives denoted in Paragraph 1 during and at the conclusion of the inspection on January 12, 1987. The inspectors summarized the scope and results of the inspection and discussed the likely content of this inspection report. The licensee acknowledged the information and did not indicate that any of the information disclosed during the inspection could be considered proprietary in nature.