

U. S. NUCLEAR REGULATORY COMMISSION

REGION III

Report No. 50-457/88007(DRS)

Docket No. 50-457

License No. NPF-75

Licensee: Commonwealth Edison Company
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Chicago, IL 60690

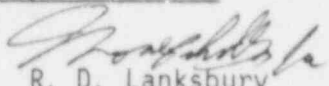
Facility Name: Braidwood Station, Unit 2

Inspection At: Braidwood Site, Braidwood, Illinois

Inspection Conducted: February 16 through March 7, 1988

NRC Operational Readiness Inspection Team


Inspectors: Team Leader:


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3/29/88

Date

Team Members:


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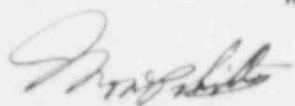
W. B. Grant

Date


W. J. Kropp

3/29/88

Date


Approved By: M. P. Phillips, Chief
Operations Section

3/29/88

Date

Inspection Summary

Inspection on February 16 through March 7, 1988 (Report No. 50-457/88007(DRS))

Areas Inspected: Special announced team inspection by Region III, NRC Headquarters, and senior resident based inspectors to perform an operational readiness inspection prior to full power licensing of the Braidwood Unit 2 plant. Areas reviewed included: operations, surveillance and testing, maintenance, radiation controls, chemistry controls, nuclear engineer activities, and training.

Results: Of the seven functional areas inspected, no violations or deviations were identified in six of the seven areas. However, one Open Item (paragraph 5.f) was identified in one functional area (maintenance) to track resolution of a perceived problem with the licensee's scheduling of periodic lubrications, and one Unresolved Item (paragraph 6) was identified in another functional area (radiation controls) to track resolution of a potential noncompliance with Technical Specification requirements for control of Radiation Control Technicians overtime. Within the remaining functional area (operations) two violations were identified. One violation (paragraph 3.j) was identified for failure to write a deviation report, as required, after the Boric Acid Transfer Pumps recirculation line was identified as having become plugged. The second violation (paragraph 3.k) involved multiple examples of a weak and ineffective Out-of-Service program. After returning to the Braidwood station to followup on corrective actions instituted by the licensee as a result of the initial inspection, the ORI was able to make a recommendation to Region III management for issuance of a full power license for Braidwood Unit 2.

DETAILS

1. Persons Contacted

Commonwealth Edison Company (CECo)

- +T. J. Maiman, Vice President PWR Operations
- +K. L. Graesser, General Manager Nuclear Operations
- +E. E. Fitzpatrick, Station Manager
- @+K. Kofron, Production Superintendent
- @+D. E. O'Brien, Services Superintendent
- @+P. L. Barnes, Regulatory Assurance Supervisor
- @+E. W. Carroll, Regulatory Assurance
- @T. W. Simpkin, Regulatory Assurance
- +L. M. Kline, Regulatory Assurance
- +R. E. Acker, Radiation/Chemistry Supervisor
- +G. R. Masters, Assistant Superintendent Operating
- +D. E. Paquette, Assistant Superintendent Maintenance
- +J. G. Marshall, Unit 2 Station Startup Assistant
- +R. J. Ungeran, Operating Engineer, Unit 1
- +R. Yungk, Operating Engineer, Unit 2
- +R. A. Fussner, Staff Engineer, PWR Operations
- +P. F. Hart, QA Engineer
- +J. A. Jursenas, QA Engineer
- +E. Steckhan, QA Engineer
- +R. E. Benn, Assistant Security Administrator
- +R. C. Herbert, Nuclear Safety
- +S. C. Hunsader, Nuclear Licensing Administrator
- @K. Boyle, Operations Staff
- @R. Legner, Senior Operations Engineer

The inspectors also contacted and interviewed other licensee and contractor personnel.

Nuclear Regulatory Commission

- +E. G. Greenman, Director, Division of Reactor Projects, Region III
- +W. L. Forney, Chief, Projects Branch 1, Region III
- +J. M. Hinds, Jr., Chief, Projects Section 1A, Region III
- @+T. M. Tongue, Senior Resident Inspector, Braidwood
- +T. E. Taylor, Resident Inspector, Braidwood
- @+R. D. Lanksbury, Operational Readiness Inspection Team Leader, Region III
- @+B. H. Little, Senior Resident Inspector, Callaway
- +P. G. Brochman, Senior Resident Inspector, Byron
- +S. M. Hare, Reactor Inspector, Region III
- +S. P. Sands, Licensing Project Manager, Office of Nuclear Reactor Regulation (NRR)
- +W. B. Grant, Radiation Specialist, Region III
- +W. J. Kropp, Reactor Inspector, Region III

+Denotes those attending the interim exit meeting on February 19, 1988.

@Denotes those attending the exit meeting on March 7, 1988.

2. General

The Operational Readiness Inspection (ORI) was conducted in order to help determine whether Commonwealth Edison Company should receive a recommendation from Region III to operate Braidwood Unit 2 above 5% reactor power. Licensee activities were closely monitored in order to ensure the facility was being operated safely and to ascertain the licensee's readiness to operate at power levels up to 100%. The inspection included examination of the interface between the operations department and other on-site organizations to assess the effectiveness of the entire station organization.

In June of 1987 an ORI was conducted for Braidwood Unit 1. Because of the broad scope of this ORI and the relatively short duration between it and the Unit 2 ORI, certain areas, such as lines of responsibility, that are common to both units and for which there was no indication of significant changes, were not re-inspected.

The ORI team was comprised of the leader, a region based reactor inspector; two Senior Resident Inspector (SRI's) from other operating reactor facilities in Region III, the NRR licensing project manager for Braidwood, two region based reactor inspectors, and one region based radiation specialist.

3. Plant Operations (36700, 71707, 71715)

An inspection of plant operations was performed by observing the performance of the licensee's operating staff on all shifts with the following objectives (it should be noted that during this inspection neither Unit 1 nor Unit 2 was critical and therefore observation of plant operation was constrained):

- o Determine adequacy of shift turnovers, attentiveness to indications, communications between operators, awareness of plant status, procedural compliance, control room congestion, completeness and accuracy of logs, performance during abnormal conditions, communications with other departments, independent verification effectiveness, and the effectiveness and involvement of supervision and management.
- o Review workload of operating crew, especially staff assistants. Determine quality of prioritizing the work that goes through the operations group before scheduling.
- o Review followups to events, critiques of events, and LCO Time Clocks (who tracks, how, effectiveness).
- o Evaluate communications between the Control Room personnel and others, particularly during off normal events.

The following observations were made:

- a. Adequacy of shift turnovers - The shift turnover process at Braidwood may be subdivided into three distinct evolutions. The first part of the shift turnover was made possible by the oncoming shift arriving an hour early, performing a panel walkdown, and discussing with their individual counterparts the turnover checklist and plant status. The second part of shift turnover was the shift briefing at which representatives from the oncoming operations, maintenance, health physics, chemistry, and technical services staff discuss plant status and planned activities for the upcoming shift. The third and final portion of the shift turnover has the Shift Engineer (SE), Shift Control Room Engineer (SCRE) and Center Desk Operator brief the oncoming plant operators on plant status and activities planned for the shift.

Shift turnover activities were monitored throughout the inspection period for all of the day, swing and mid-shift turnovers. The inspector's noted that shift turnovers were professionally conducted and sufficiently comprehensive in scope to ensure that the oncoming shifts were aware of plant status and the activities planned for that shift.

- b. Attentiveness to indications - Operators were alert and attentive to panel instruments and alarms at all times. All abnormal instrumentation indication observed was adequately responded to, with Work Requests (WR's) generated as appropriate.
- c. Awareness of plant status - With the exception of one instance, all shifts appeared aware of plant status as demonstrated through inspector observation and interviews with operators. The inspectors noted that when Unit 1 was in mode 4 and the Volume Control Tank (VCT) was being "burped" to replace the nitrogen cover gas with hydrogen, that the Unit 1 Nuclear Station Operator (NSO) appeared not to be aware of the evolution. The Unit NSO queried the equipment attendant who had just performed valve manipulations on a Reactor Coolant Pump (RCP) filter/drain line as to whether he had left any valves open or leaking. The Unit NSO then directed the attendant to go back and check the drain line for leakage. The inspector questioned the Unit NSO as to why he had urgently dispatched the attendant back into the field. The NSO indicated that the VCT had experienced a rapid decrease in level which he believed was caused by a leak. The inspector went to the VCT level/pressure strip chart recorder and noted that the rapid VCT level decrease was caused by the diversion of letdown to the Hold Up Tank. The extra NSO on shift who had been monitoring this evolution confirmed the inspector's observations. This event indicated the following:
 - (1) Shift management had not successfully communicated with the Unit NSO.
 - (2) The Unit NSO was insufficiently aware of the plant's status to know why the VCT level was dropping.

- (3) The extra NSO who was monitoring the process did not communicate to the unit NSO why VCT level was dropping.

With the exception of this instance, all other shifts appeared aware of plant status. However, the ORI did note that interviews with operations staff personnel indicated a general lack of confidence in plant status do to the current system in place for Out-Of-Services and Temporary Lifts (these are further discussed in Section 3.k).

- d. Communications - Communications within the operating staff were observed to be good with information flowing smoothly from the SE and shift foremen (SF) to the SCRE to the licensed and non-licensed operators. Communications between departments during the shiftly briefings also appeared to be good. The only instance of poor communication observed is described in paragraph C above.
- e. Control room congestion - The control room was not overly congested during the inspection period even though Unit 2 was in mode three while Unit 1 was attempting to come on line after an outage.
- f. Completeness and accuracy of logs - The SE, SF, SCRE, and NSO's logs were reviewed for accuracy and thoroughness. The following deficiencies in log keeping were identified:
 - (1) The NSO's log contained only infrequent notes (one) on when the Boric Acid Transfer Pumps (BATPs) were run to recirculate the Boric Acid Storage Tanks even though the BATPs were run once every several days.
 - (2) The NSO's logs did not identify that the Boric Acid recirculation line was found plugged on February 18, 1988, which made recirculation of boric acid from the tank impossible.
 - (3) The Unit 2 NSO log did not document the Unit 2 BATP failure of a post-maintenance test even though the NSO was contacted by the personnel performing the test to stop the pump due to it's imminent failure.
 - (4) The Shift Foreman who approved the temporary lift to perform the BATP post-maintenance test did not document the failure which resulted in him not discussing pump failure during shift turnover.

Additional deficiencies related to the accuracy and thoroughness of logs have also been identified by the Resident Inspectors. Additional information pertaining to this item is contained in their inspection report (456/88008(DRP); 457/88009(DRP)).

- g. Performance during abnormal conditions - During this inspection period two (2) instances were noted in which operator action was taken in response to abnormal conditions.
- (1) On February 18, 1988, on the mid shift, a Unit 2 source range nuclear instrument, NI-31, was returned to service after calibration per BwIP 2504-003. As a result of this instrument being returned to service, a Boron Dilution Prevention System actuation occurred due to several steps in the procedure being out of order. After diagnosis, the operators promptly took action to return the plant to its previous configuration which required reestablishing normal letdown and switching the suction of the charging pumps from the Refueling Water Storage Tank (RWST) to the VCT. The operators performance for this event was good. Actions were taken to generate a procedural revision to reverse the subject procedural steps.
 - (2) On February 13, 1988, on the swing shift, an LCO was entered on Unit 2 which required Unit 2 to reduce temperature and change modes. When normal makeup was initiated to maintain VCT level, the operators noted no boric acid flow. Per abnormal procedure PRI-2, the operators attempted to establish normal and emergency boric acid makeup. When this effort failed, the NSO's dispatched plant operators to troubleshoot the problem. As a result of this troubleshooting effort, a boric acid flow path was later established. Operator action in response to this event was considered good.
- h. Workload of operating crews - Inspectors viewed workload as heavy which is normal for a plant that is, in effect, starting up two units at once. While the workload was heavy, business was conducted in an orderly fashion and, with the exception of the administrative aspects of the temporary Lift program, the workload appeared well managed.
- i. Effectiveness and involvement of supervision and management - Inspectors attended shift turnover meetings where plant status and plans for the shift were discussed. Management personnel other than the normal shift complement were observed in the mid to day shift and the day to swing shift turnovers. Further, senior plant management was observed in the control room at least once during the day and swing shifts. Conversations with shift personnel indicated that station management was involved in plant operation in positive ways. Based on inspector observations and personnel interviews, the inspectors concluded that management involvement with plant operations was comprehensive and effective.
- j. Event followup and evaluation - On February 18, 1988, at 1635 CST, the Unit 2 Nuclear Supervising Operator (NSO) attempted, but was unable to initiate normal or emergency boration using the "0" Boric Acid Transfer pump. Subsequently, during a system walkdown, the licensee found Valve 2AB8458 (miniflow recirculation valve) closed.

Based on discussion with the Unit 2 NSO and a review of the NSO log, the inspector determined that the "0" B ATP pump had been running in the recirculation mode when the NSO assumed the watch (at approximately 1500 CST), and apparently had become steam bound. There was no log entry on starting the "0" B ATP in the recirculation mode. Additionally, after opening valve 2AB8458 and running the "0" B ATP pump, flow to the CVCS system was verified, but still no recirculation flow was obtained. The NSO expressed belief that the recirculation line was plugged; however, the problem of the plugged recirculation line was not entered in the NSO log, nor was a deviation report initiated to document the deficient condition.

Administrative procedure BwAP 1250-2 (Deviation Reporting) defines a deviation as: "a departure from accepted equipment performance or a failure to comply with administrative controls or NRC requirements which results in, or could, if uncorrected, result in a failure of an item to perform as required by Technical Specification or approved procedures."

BwAP 1250-2 Paragraph 3 (Processing of Deviations) specifies that the person identifying the deviation: "Initiate a Deviation Report (DVR) Form 15-52 1. Enter as much applicable information as is known on Part 1 of the DVR and forward the DVR to the Supervisor responsible for the equipment or activity."

The licensee's failure to initiate a deficiency report documenting the plugged recirculation line is contrary to administrative procedure BwAP 1250-2 and is a violation (457/88007-01/(DRS)) of 10 CFR Part 50, Appendix B, Criterion XVI, Corrective Action.

- k. Equipment Control - The inspectors reviewed the licensee's equipment control program to assess the overall system readiness for operation and administrative controls associated with equipment/systems in an "Out-Of-Service" (OOS) condition. The licensee's OOS program was described in procedure BwAP 330-1, Station Equipment Out-Of-Service Procedure, Revision 5 dated January 7, 1988. In addition to reviewing several OOS packages, a review of Temporary Lifts was also performed. Temporary Lifts are intended to allow testing of equipment following maintenance, but prior to clearing the OOS. As a result of this review, the inspectors determined that the licensee's OOS program was not effective in that:
- (1) Five of approximately 14 Temporary Lift packages that were in effect were reviewed and had been processed (OOS tags removed) without the specified documented authorization:
 - (a) The Temporary Lift for the following OOS No.'s contained no documented authorization: 88-1-0048, 88-1-0049, 1LC-MS114 and MSXXX. This was contrary to paragraph C.6.b.2. of the subject procedure which required Shift Engineer (or designee)/Shift Foreman authorization on all Temporary Lifts.

- (b) The Temporary Lift for OOS No. 88-1-428, had been authorized by the Shift Foreman on February 9, 1988. As of February 17, 1988, the specified Shift Engineer's approval had not been documented. This was contrary to paragraph C.6.b.3. of the subject procedure which required Shift Engineer approval on all Temporary Lifts which extend greater than 24 hours.

Subsequent to this, the inspectors reviewed completed Temporary Lift Forms for August, October, and December 1987. Of the approximately 2000 forms reviewed, 20 (or approximately 1%) were missing the required signatures.

The licensee's failure to follow the required approval requirements for the approval of Temporary Lift packages was an example of a Violation (457/88007-02A(DRS)) of 10 CFR Part 50, Appendix B, Criterion V requirements for following procedures.

- (2) Of the 14 Temporary Lift records reviewed the following examples were identified where Temporary Lift instructions were not complied with:
- (a) Temporary lift for OOS No. 88-1-428 specified that the equipment was "To be returned to service on February 9, 1988." This action had not been performed as of February 17, 1988.
- (b) Temporary Lift for OOS No. 88-2-0201 specified that: "Leave Temp Lifted until RCS reaches 557°F, then rehang." Unit 2 reactor coolant reached 557°F on February 16, 1988 and this action had not been performed as of February 18, 1988.

Procedure BwAP 330-1 was not appropriate to the circumstances in that it failed to contain guidance describing the use of instructions on Temporary Lifts. The procedure also contained no method to track instructions on Temporary Lifts. This was considered an example of a Violation (457/88007-02B(DRS)) of 10 CFR Part 50, Appendix B, Criterion V requirements for appropriate procedures.

- (3) The status of mechanical and electrical equipment under Temporary Lift was not documented. Unit 1 had approximately 100 Temporary Lift packages, each containing multiple tags. Unit 2 had 11 Temporary Lift packages. Although several record sheets contained as left required component positions, most sheets did not. The record sheets did not provide for the required component positions nor did the Temporary Lift procedure require such notations be entered. The ORI team noted that the absence of an as left required component position on the Temporary Lift form was a weakness in the licensee's OOS program.

- (4) On January 10, 1988, OOS 88-096 was completed and lifted. This Equipment Outage identified valve 1AF009B as closed and when the outage was lifted, valve 1AF009B was left in the closed outage position. When the Manual SI 18 month surveillance was run on February 7, 1988, a valve lineup was not required by procedure nor performed. As a result, the Diesel Auxiliary Feedwater AFW pump was operated with its recirculation valve (1AF009B) closed. The operation of the pump with its recirculation valve closed resulted in failure of the pump. This caused significant damage to the pump which required extensive repair. The restoration of the subject OOS was inadequate to ensure the correct normal valve lineup.

Procedure BwAP 330-1, Section C.4.n., required that when returning equipment to service, that all equipment listed on the equipment outage form be returned to service. The failure to return valve 1AF009B to service from its Out of Service position was an example of a Violation (457/88007-02C(DRS)) of 10 CFR Part 50, Appendix B, Criterion V requirements for following procedures.

- (5) A Temporary Lift was issued on February 17, 1988, for OOS 88-1-193 and OOS 88-1-917 to test the repaired Diesel AFW pump. OOS 88-1-193 removed the 4 control power fuses. These fuses were supposed to be replaced per the Temporary Lift. When a remote AFW pump start was attempted, the pump did not start. Licensee investigation revealed that 1 of the 4 control power fuses installed was a "dummy fuse." This apparently had been installed sometime after the original OOS was hung. When the OOS was temporarily lifted, the person who verified that the fuses were installed, failed to recognize that the fuse (which was not in the OOS position) was a "dummy fuse."

Procedure BwAP 330-1, Section C.6.c., required that all equipment listed on a Temporary Lift be removed from its OOS position. The failure to remove the "dummy fuse" and restore the fuse was an example of a Violation (457/88007-02D(DRS)) of 10 CFR Part 50, Appendix B, Criterion V requirements for following procedures.

- (6) OOS 88-2-386 dated February 7, 1988, required the Unit 2 Boric Acid Transfer Pump (BATP) recirculation, suction, and discharge valves be closed to permit pump maintenance. This OOS was deficient in that it did not establish a recirculation flowpath for the common BATP which served as a backup for the Unit 2 pump.

The following events occurred between the time the recirculation valve was closed on February 7, 1988, to when it was discovered closed on February 18, 1988.

- (a) When the Unit 2 BATP was run on February 16th and again on February 18th to recirculate the storage tank, there was no flowpath. On February 18th, the pump was discovered to be inoperable (steam bound).

- (b) The normal and emergency boration flow paths from the Boric Acid Storage Tank were inoperable when required on February 18th.
- (c) The miniflow recirculation line became clogged with boric acid due to stagnant flow conditions.
- (d) The Unit 2 BATP experienced mechanical seal failure on February 17th, which could have been due, in part, to the recirculation flowpath being plugged and the resultant lack of recirculation flow.

The failure of the licensee's OOS program to ensure the common BATP had a recirculation flowpath when the Unit 2 BATP was taken OOS for repair was an example of a Violation (457/88007-02E(DRS)) of 10 CFR Part 50, Appendix B, Criterion V requirements for appropriate procedures.

The above implementation and program deficiencies were discussed with the licensee during an interim exit meeting on February 19, 1988. The licensee acknowledged and was responsive to the ORI team findings. The licensee discussed immediate action, taken and planned, to improve equipment OOS controls.

On March 7, 1988, a reinspection of the licensee's equipment control program, procedures, and equipment was performed to assess the overall effectiveness of corrective action in this matter. The inspection included the review of changes to plant procedure BwAP-330-1 (Equipment Out of Service); a sampling of four equipment OOS packages, a complete review of all active Temporary Lift packages, and tracking reports for Degraded Equipment and Limiting Conditions for Operation Action Report (LOCAR). In addition, a field inspection was performed to verify that plant valves and electrical controls were correctly positioned as documented in the three safety-related Temporary Lift packages in effect at the time of the inspection.

Revision 6, dated February 26, 1988, of procedure BwAP-330-1 required double verification of breaker and valve position when placing a system out of service and when restoring a system to service. The procedure and Temporary Lift record sheets provide for "as left" positions of components in test.

The OOS and Temporary Lift packages reviewed contained appropriate authorization. After identification of the instances of the licensee's failure to have the correct level of authorization on a number of OOS Temporary Lifts and the failure to comply with instructions written on the OOS Temporary Lifts, the licensee took immediate corrective actions. This included contacting each of the Shift Engineers and reinforcing their responsibility with regard to the OOS program.

There had been a significant reduction in the number of active Temporary Lift packages; e.g. Unit 1 was reduced to two (from a previous level in excess of 100) and Unit 2 reduced to one (from a previous level of 11). There was one package for a system common to both units. The licensee's actions to improve equipment control appeared to be effective. No deficiencies were identified during reinspection in this area.

- l. Effectiveness of plant tours - Inspectors accompanied non-licensed operators on their rounds to assess their performance and knowledge of plant conditions. The non-licensed operators were knowledgeable and effective in their areas of responsibility. A variety of functions were observed, such as startup of various equipment. These functions were well executed. In general the quality of plant walkthroughs was good.

- m. Procedure implementation and independent verification - The implementation of portions of the following procedures were witnessed in the control room and/or Shift Engineer's office.

| | |
|-------------------|---|
| BwOP-MS-5 | MSIV Accumulator Operability Check |
| BwOP-CD/CB | Condensate/Condensate Booster System Checkout |
| BwsU-IC-70 | Incore Flux Mapping System Checkout |
| BwIP 2504-003 | Source Range Hi Flux at Shutdown Alarm Calibration |
| BwOP Wx-500-1.T.1 | Liquid Release When Flowmeters are Inoperable |
| BwOP-199 | Equipment Attendant Auxiliary Building Logs |
| BwOS 4.6.2.1.d-1 | Reactor Coolant System Water Balance |
| BwAP 100-7 | Overtime Guidelines for Personnel that Perform Safety Related Functions |

Procedure implementation and compliance by operations personnel appeared good. Independent verification was performed satisfactorily when required.

- n. Technical Specification LCO's - The inspector reviewed the documentation for all of the Technical Specification Limiting Conditions for Operation which were in effect. The Limiting Condition for Operation Action Requirements (LOCAR) documents were reviewed to verify that required signatures, notifications, and compensatory surveillances had been completed. The inspector identified two discrepancies in the completion of LOCAR paperwork. Licensed Senior Reactor Operator (SRO) reviews of compensatory actions performed by the radiation/chemistry department were not performed. LOCAR BwOS 3.3.9-1a required that with radiation monitor ORE-PRO10 inoperable, liquid releases could continue by monitoring with grab samples and completing the log in Appendix A, data sheet 1. The radiation/chemistry department had completed its portion of data sheet 1, for the liquid effluent releases which had occurred since

the monitor became inoperable on January 27, 1987; however, no SRO review of these actions was indicated on the data sheet. Similar problems existed with LOCAR 1BwOS 3.3.10-1a, data sheet 1, for oxygen analyzer OAT-GW004. The review did not identify any instances where required compensatory actions had not been performed, only that the SRO reviews had not been completed. However, the ORI considers that the inconsistent supervisory review, by licensed SRO's, of the adequacy and timeliness of compensatory actions taken in accordance with Technical Specification action statements was a programmatic weakness that should be addressed by the licensee.

Two violations were identified in this functional area (paragraphs 3.j. and 3.k.). No deviations were identified.

4. Surveillance and Testing Observation (72302)

Station surveillance activities of the safety-related systems and components listed below were observed/reviewed to ascertain that they were conducted in accordance with approved procedures and in conformance with Technical Specifications.

The following items were considered during this review: the limiting conditions for operation were met while affected components or systems were removed from and restored to service; approvals were obtained prior to initiating the testing; testing was accomplished in accordance with approved procedures; test instrumentation was within its calibration interval; testing was accomplished by qualified personnel; test results conformed with Technical Specification and procedural requirements and were reviewed by personnel other than the individual directing the test; and any deficiencies identified during the testing were properly documented, reviewed, and resolved by appropriate management personnel.

The inspection focused on the following areas:

- Preparation; including adequacy of procedures, equipment, pre-task briefings and task knowledge.
- Performance discipline; including supervision and control, procedure adherence, and communications.
- Documentation and resolution of deficiencies.
- Independent verification and review.

The following surveillance testing activities were observed/reviewed:

| <u>Procedure No.</u> | <u>Activity</u> |
|----------------------|---|
| BwOS - 0.1, 2, 3 | Daily Operating Surveillance. |
| BwIS - 3.1.1 - 303 | Δ T/Tavg Analog Operational Test and Channel Verification Calibration. |

BwIS - 3.3.6 - 205 Calibration of Reactor Vessel Level Indication System RVLIS.

BwIS - 3.1.1 - 388 Pressurizer Pressure Protection Analog Operational (PO-456).

BwOS - 3.1.1 - 36.1 Intermediate Range NI Surveillance.

The inspectors determined that the licensee had implemented, appropriately reviewed and approved procedures for the surveillance and testing activities. Special test equipment functioned well and instruments were in current calibration. Personnel involved in supervision and performance of the tasks appeared well trained/knowledgeable of task objectives and equipment operation. Procedure review and pre-task briefings were routinely performed. The surveillance and test procedures were generally well written, containing appropriate precautions and notes.

The inspectors determined that control room supervision and operators maintained adequate control over the surveillance and test activities. Personnel performing the tasks demonstrated a high degree of performance discipline and procedures were followed in a step-by-step method.

No violations or deviations were identified.

5. Maintenance (62700,62703)

The inspectors reviewed selected maintenance activities to assess the capabilities of the licensee's maintenance staff to maintain Unit 2 in an acceptable manner. The areas assessed included:

- Maintenance backlog
- Maintenance testing
- Completed Nuclear Work Requests (NWRs)
- Staffing of the maintenance organization
- Threshold for initiating NWRs
- Preventive maintenance
- Material condition

- a. With respect to backlog, the licensee reported corrective maintenance backlog in the Braidwood Monthly Plant Status Report as those Nuclear Work Requests (NWRs) outstanding, which were ready for work (outage not required). The inspector determined through discussion with the licensee that there were also Construction Work Requests (CWRs) outstanding pertaining to corrective maintenance. These CWRs were not being identified as backlog corrective maintenance in the Braidwood Monthly Plant Status Report. The licensee did not furnish the number of corrective maintenance CWRs outstanding; however, the inspector did ascertain that the backlog of corrective maintenance documented on NWRs was 920. These 920 NWRs were assigned as follows:

175 - Unit 1
394 - Unit 2
351 - Unit 0

The Preventive Maintenance (PM) backlog reported in the licensee's Monthly Plant Status Report represented only those PMs pertaining to the Technical Specifications. Other backlog PMs, such as lubrication and the calibration of plant instruments, were not reported in the backlog population. During this inspection the licensee furnished the inspector with the PM backlog for these non-Technical Specification PMs. The PM backlog was as follows:

Instrument Calibration - 23 BOP past their critical due date.

Electrical Component Inspection - 26 breakers or Motor Control Centers.

Lubrication - 21 pieces of equipment past due.

The licensee had committed to furnish revised backlog information, which would include those CWRs pertaining to corrective maintenance and PMs, prior to the Unit 2 full power Commission meeting.

- b. The inspectors witnessed a maintenance test of the 1B Auxiliary Feedwater (AFW) pump. The diesel driven 1B AFW pump failed to start during this test. Investigation by the licensee determined that fuses in the 1B AFW local control panel were not re-installed during the Temporary Left of the Out-of-Service. This event is further discussed in Paragraph 3.k.5 of this report.
- c. The inspectors reviewed twenty completed NWRs which were located in the Central Files. The packages reviewed were: A11892, A11896, A17102, A13004, A17244, A18764, A11903, A17185, A05524, A10717, A17831, A17403, A19406, A17115, A16174, A12101, A12082, A18584, A17116, and A12229. Final review of these packages had been performed by maintenance, QA and QC. The appropriate review signature was noted and the documentation associated with each package appeared adequate. No significant problems were noted involving plant hardware.
- d. The inspectors reviewed the maintenance organization charts furnished by the licensee. The staffing levels appeared adequate to perform required maintenance activities. The maintenance department was divided into three disciplines: electrical, mechanical and instrumentation. Each discipline was headed by a supervisor. The planning of maintenance activities was performed by the Station Startup/Work Planning organization. This organization had work planners for continuous work and outage work planners for the planning of outage activities.
- e. The licensee threshold for placing equipment problems on NWRs was evaluated for adequacy. The inspector reviewed the control room logs for Unit 1 and Unit 2 and selected three Unit 1 log entries and seven Unit 2 log entries which indicated potential equipment problems. In each case, the licensee had initiated an NWR to resolve the problem or had addressed the problem in an acceptable manner. Therefore, the licensee's threshold for placing equipment problems on NWRs appeared to be adequate to maintain the material condition of the plant.

- f. The inspectors reviewed the licensee's preventive maintenance (PM) program. The PM program consisted of various activities such as: lubrications, vibrations analysis, instrument calibration, heat exchanger nondestructive testing, etc. These activities were controlled by various computer programs which currently do not interface with each other. As a result, the inspector required significant plant staff assistance in assessing the PM backlog. The licensee stated action had already been initiated to allow easier retrievability by computer of the status of PMs.

During the plant walkdown by the inspectors, the lower motor bearing sightglass for both the 2A and 2B Residual Heat Removal (RHR) pump motors had oil which appeared to need changing. A review of the computer printout for lubrications indicated that the initial entry for the RHR pump motors was January 4, 1988, with a due date of January 4, 1989 (12 month frequency). A review of construction records determined that both the 2A and 2B RHR pumps had been run since April 1987 at various times during Unit 2 preoperational testing. Therefore, it appears that the due date of January 4, 1989, was established based on the initial entry of the RHR pump motors into the lubrication program and not based on a technical assessment. It appears that the due date would more appropriately have been April 1988, based on the run history of the RHR pumps. The issue of scheduling of the lubrication of equipment/components is considered an open item pending further NRC review (453/88007-03(DRS)).

- g. The inspectors performed a walkdown of portions of Unit 2 to evaluate the material condition of the plant. With the exception of several minor instances, the inspectors did not identify any equipment problems that had not already been identified by the licensee. However, the inspectors did identify two cases where maintenance activities resulted in the following:
- A debris screen from the 2B diesel AFW pump fan intake had been removed and stored against an instrument rack in the 2B AFW pump room. This action could have potentially resulted in damage to the installed instrumentation and inadvertent mispositioning of an instrument valve. Since Unit 2 was in Mode 3 the 2B AFW pump was required to be operable. The licensee took immediate corrective action to properly store the debris screen.
 - The 2A motor driven AFW pump had various materials, such as coats, extension cords, and tools, laying on the motor. At the same time there were maintenance activities being performed in the adjacent 1A AFW pump area. The 2A AFW pump was required to be operational. The licensee took immediate corrective action to remove this material.

In summary, the inspectors concluded that the licensee's maintenance activities were performed adequately to support a Unit 2 full power license. However, the licensee needed to improve on their statusing of maintenance backlog. Also, the licensee should increase the awareness of their equipment operators on the need to ensure maintenance activities do not affect the operability of equipment in areas where maintenance is being performed.

One open item was identified in this functional area (paragraph 5.f). No violations or deviations were identified.

6. Radiation Protection (83722, 83724, 83725, 83726, 83728)

The inspector met with various members of the radiation chemistry (Rad/Chem) staff, including: the Rad/Chem Supervisor, the lead Health Physics Foreman, a staff Health Physicist (HP), and various Rad/Chem technicians (RCTs).

A number of licensee strengths within this functional area were identified during the inspection, including:

- RCTs appeared to be knowledgeable of plant systems and procedures, and of their responsibilities.
- In order to support the simultaneous startup and startup testing of Unit 1 and Unit 2, the licensee has contracted for the services of 32 RCTs in addition to their normal staff.
- No significant Radiation Occurrence Reports (RO'S) were generated for 1987 or January of 1988.

The inspector witnessed the changing of the reactor coolant filter for Unit 1. The reactor coolant filter had a contact reading of 300 Rad/hr. Prior to the filter change several work group discussions were conducted and an ALARA planning meeting was held. The inspector observed that the exchange of information during the course of these meetings appeared good. The changing of the reactor coolant filter was completed without problem.

The ORI conducted in June 1987 for Unit 1 made three observations in this functional area. The inspector reviewed the licensee's actions for these three observations.

- Audible speakers on GM survey meters used at the 401' Auxiliary Building to Turbine Building door and the 426' Containment entryway could not be heard by the surveyors because the background noise level was too high. During this inspection the inspector verified that the licensee had purchased kits for the installation of earphones on several GM survey meters. At the time of this ORI the installation of these earphones was in process.
- Rad/Chem surveys of the laundry room were done with a "Cutie Pie" (a relatively high range instrument). During the inspection the inspector verified that the licensee was now using GM survey meters (a lower range instrument than the "Cutie Pie") for performing surveys of the laundry room.

- RCT workhours exceeded the guidelines of NRC Generic Letter 82-12 which limit the working hours of Unit Staff who perform safety-related functions. The inspector reviewed records of hours worked by RCTs for the period of January 19 through February 1, 1988, and found the situation continuing; 15 RCTs (almost half of the total member of licensee RCTs) appeared to have worked hours in excess of those specified in Generic Letter 82-12. This finding was consistent with the previous ORI's finding. The licensee's position is that only the one Duty RCT required as part of the Technical Specification for minimum shift manning was required to comply with the Generic Letter 82-12 working-hour limitation. This position does not appear to meet the intent of Technical Specification 6.2.2.e. in that the Generic Letter 82-12 working-hour restrictions are clearly applicable to "the unit staff who perform safety - related functions," not merely the minimum shift manning. An additional question is raised, however, in that the Generic Letter 82-12 restrictions appear to apply only to unit staff who perform safety-related functions, a distinction which may exempt certain RCTs. This matter has been submitted to NRR for clarification; further action to resolve this matter will be held in abeyance pending that clarification. This issue is considered to be an unresolved item (453/88007-04(DRS)).

One unresolved item was identified (paragraph 6). No violations or deviations were identified.

7. Station Chemistry (79501)

The inspector met with the Station Chemist and conducted a tour of the Chemistry Laboratory facilities. General housekeeping was excellent and all equipment was operational. RWP 88001 covers activities in the hot laboratory and counting room. Step off pads and friskers were located at the entrances. Lines of responsibility are defined and no interface/communication problems between Chemistry and other departments were identified. The Rad/Chem Supervisor attends the Plan of the Day (POD) meeting, and in his absence, either the Station Health Physicist or the Station Chemist attends. A Chemist attends each shift briefing.

Both the primary and secondary chemistry were within specifications during this inspection. The chemistry department implemented a monthly chemistry report which was submitted to the assistant Superintendent, Operations. The inspector reviewed the December 1988 monthly chemistry report, which included Unit 2 chemistry and found the following:

- Primary

During the month of December, the Unit 2 reactor coolant system was borated to >2000 ppm boron for fuel load. The RCS core load chemistry test, PS-70, was performed successfully to ensure the RC, RH, CV, SI, CS, AB, and FC systems contained the proper concentration of boron to

support fuel load. For December, the RCS boron and chloride average concentrations were 2073 ppm and 20 ppb, respectively. There was no detectable fluoride concentration for the RCS during December. The 2B CV mixed bed demineralizer was borated to 2000 ppm boron while the 2A demineralizer remained unborated. Lithium hydroxide was added and increased the RCS pH from 5.1 to 5.95 in order to reduce the rate of corrosion.

- Secondary

The Unit 2 steam generators were placed in dry lay up in December. The main condenser was accidentally filled to 15 feet with CST water. The water specific conductivity was 22 umhos/cm. Two-thirds of the water was drained to the wastewater treatment system and the final third was being cleaned up via a temporary demineralizer (Ecolochem) and will be utilized to fill, vent and flush the condensate and feedwater systems. Once the system flushes are completed and the water is verified to meet initial condensate specifications, the temporary demineralizers will be removed from service and hydrazine and ammonium hydroxide will be added for lay up chemistry.

Region III has one open item regarding operability of the secondary sampling panel for Unit 2. The inspector verified the operation of the sampling panel with a chemistry engineering assistant. No problems were noted. This item will be closed in the resident inspectors monthly report (456/88008; 457/88009).

No violations or deviations were identified.

8. Nuclear Engineers Activities (71707, 72302)

The performance of startup test procedure BWSU IT-73, "Incore Thermocouple (Core Exit Thermocouple (CET)), Revision 0, Section 9.4. was witnessed. The inspector determined that the Nuclear Engineers who were directing the test were knowledgeable of testing in progress and that their interface with the operations staff was good. Activities appeared well-controlled. Special test equipment functioned well and instruments were in current calibration. Personnel involved in supervision and performance of the test appeared well trained/knowledgeable of test objectives and equipment operation. Personnel performing the test demonstrated a high degree of performance discipline and the procedures were followed in a step-by-step method. Communications involving approval, instruction, and status were conducted in a business-like manner.

No violations or deviation were identified.

9. Training (41400)

The effectiveness of training programs for licensed and non-licensed personnel was observed by the inspectors during the witnessing of the licensee's performance of routine surveillance, maintenance, and operational activities. Except for weaknesses in the implementation of the Out of Service program identified in the section on operations, the station staff performed in a highly trained and motivated fashion. Licensed and non-licensed operators were knowledgeable of the plant equipment. Mechanical, electrical, and instrumentation and control technicians were observed at their tasks and performed their duties with skill. In other departments, employees also performed in such a way as to demonstrate effective training programs.

No violations or deviations were identified.

10. Exit Interview (30703)

The ORI met with the licensee representatives denoted in Paragraph 1 during the inspection and again on February 19, 1988. The ORI summarized the scope and findings of the inspection activities and highlighted the need for management attention in the areas discussed in the previous paragraphs. The ORI further noted that primarily because of the problem observed with OOS's and Temporary Lifts, and the fact that the operations staff did not feel confident of plant status as a result of the current system in these areas, that a recommendation for a full power license could not be made at that time. The licensee acknowledged the inspection findings and stated that programmatic changes in the area of OOS's and Temporary Lifts were already being planned and would be implemented in the relatively near future.

Members of the ORI again met with the licensee representatives denoted in Paragraph 1 at the conclusion of the inspection on March 7, 1988. The ORI summarized the findings of the inspection activities since the previous meeting on February 19, 1988. The ORI noted that the licensee had been very responsive in taking action to correct the previously identified issues in the OOS area. As a result, the operations staff was no longer burdened with an excessive workload in the OOS area and that they now felt confident about their knowledge of plant status. As a result of the above changes, the ORI indicated that they would recommend to the region the issuance of a full power license.

The inspectors also discussed the likely informational content of the inspection report with regard to documents or processes reviewed by the inspectors during the inspection. The licensee did not identify any such documents/process as proprietary.