U.S. NUCLEAR REGULATORY COMMISSION

REGION III

Docket Nos:	50-456, 50-457
License Nos:	NPF-72, NPF-77
Report Nos:	50-456/97022(DRP); 50-457/97022(DRP)
Licensee:	Commonwealth Edison (ComEd)
Facility:	Braidwood Nuclear Plant, Units 1 and 2
Location:	RR #1, Box 84 Braceville, IL 60407
Dates:	December 16, 1997, through January 26, 1998
Inspectors:	C. Phillips, Senior Resident Inspector J. Adams, Resident Inspector D. Pelton, Resident Inspector T. Esper, Illinois Department of Nuclear Safety
Approved by:	M. Jordan, Chief Reactor Projects Branch 3

EXECUTIVE SUMMARY

Braidwood Nuclear Plant, Units 1 & 2
NRC Inspection Report No. 50-456/97022(DRP); 50-457/97022(DRP)

This inspection included aspects of licensee operations, maintenance, engineering, and plant support. The report covers a six-week period of resident inspection from December 16, 1997, through January 26, 1998.

Operations

- The inspectors concluded that the infrequently performed activity briefing of shift personnel for removal of the "N" annunciator train was conducted and attended by the appropriate personnel. The inspectors concluded that the licensee demonstrated an excellent safety focus by providing additional Nuclear Station Operators (NSOs) in the control room and additional non-licensed operators in the field to allow for continuous monitoring of critical plant equipment normally monitored by the unavailable annunciators. The inspectors concluded that the Unit Supervisor (US) demonstrated good supervisory presence by remaining in or near the at-the-controls area and provided continuous reminders to the NSOs to remain focused on the control board indicators. The inspectors concluded that the licensee's restoration and testing of the "N" train of control room annunciators was properly performed in accordance with established procedures. (Section O1.1)

- On January 6 and 7, inspectors observed operators perform rounds of the auxiliary building and turbine building. The inspectors reviewed the day shift equipment operator, auxiliary building, and turbine building logs and concluded that readings required by Technical Specification (TS) or other commitments were obtained. (Section O4.1)

- The inspectors observed licensed operator requalification training and determined that operators promptly identified all of the off-normal and casualty events included in the training scenarios, properly used the correct procedures to place the plant in a stable condition, and correctly used self-checking and communication techniques. Inspectors concluded that supervisory personnel provided directions to operators, conducted periodic crew briefings, effectively supervised reactivity manipulations, correctly identified and entered the applicable TS action statements, properly classified the Generating Station Emergency Plan (GSEP) events, appropriately upgraded and downgraded GSEP events, and simulated the required notifications. The inspectors concluded that the simulator accurately represented the actual control boards in the control room.

Maintenance

- The inspectors concluded that the maintenance activities observed were performed in accordance with the applicable procedures, that the procedures provided the requisite information for the assigned work, that maintenance personnel demonstrated safe work practices, and that maintenance personnel were knowledgeable of the associated TS limiting condition for operations. (Section M1.1)

- The inspectors concluded that for observed surveillance activities acceptance criteria were met, personnel correctly followed the test procedures, and that surveillance tests verified the systems performed as required by the updated final safety analysis report and TS. (Section M1.2)

- The licensee identified in 1989 that all four safety-related Unit 2 main feedwater check valves (FW079A, B, C, and D) had seized in an open position due to insufficient clearances between critical components in the valve dampening mechanisms. The inspectors identified in December 1997 that critical components in the Unit 1 FW079A and D check valve dampening mechanisms were replaced in May and April of 1997 respectively without being machined to the required clearances. The inspectors concluded that the corrective actions taken for the seizing of the FW079 check valve piston rods in 1989 were not adequate to prevent recurrence. A violation was issued. (Section M2.1)

- The inspectors concluded that the licensee accurately identified, quantified, tracked, and reported the number of non-outage corrective work requests reported to the NRC as committed to in the Braidwood Station March 28, 1997, response to the NRC's request for information pursuant to 10 CFR 50.54(f). (Section M7.2)

- The inspectors identified five examples where maintenance and test equipment was not stored in accordance with station procedures. The inspectors concluded that the licensee was not appropriately controlling access to maintenance and test equipment. A violation was issued. (Section M7.3)

Engineering

- The inspectors observed progress in reducing the total number of temporary alterations. System and site engineering personnel were tracking open temporary alterations as listed in the associated documentation. The inspectors concluded plant procedures related to the temporary alteration process were followed for known plant alterations. However, the inspectors identified two unauthorized modifications that were in place for several years, but were not identified in plant design documentation. A violation was issued. (Section E2.1)

Plant Support

- The inspectors concluded that the licensee accurately identified, quantified, tracked, and reported the percent of contaminated square footage reported to the NRC as committed to in the Braidwood Station March 28, 1997, response to the NRC's request for information pursuant to 10 CFR 50.54(f). (Section R7.1)

- The inspectors observed that the station response to a fire drill conducted on December 31 was prompt and thorough and concluded fire brigade members performed (or simulated) all tasks well. (Section F4.1)

Report Details

Summary of Plant Status

Unit 1 entered the inspection period at full power and remained at or near full power for the entire period. Unit 2 entered the inspection period at full power and remained at or near full power until the reactor tripped at 9:53 p.m. on January 26. The cause of the trip was not identified by the end of the inspection period.

I. Operations

O1 Conduct of Operations

O1.1 Control Room Observations During a Planned Loss of Control Room "N" Train Annunciators

a. Inspection Scope (71707)

The inspectors attended the infrequently performed activities (IPA) briefing and observed Unit 2 control room operators during the performance of a maintenance activity to repair relay PNLA30J in panel 2PA30J. The inspectors reviewed the IPA briefing requirements contained in Braidwood Administrative Procedure (BwAP) 100-12, "Human Performance Awareness of Pre-Job Briefings/Meetings and Self Checking," Revision 5.

b. Observations and Findings

On January 6, inspectors attended an IPA briefing for a maintenance activity that would deenergize the Unit 2 power supplies for the "N" train of control room annunciators. The "N" train annunciator power supplies provided power to all Unit 2 annunciators except for the safety-related "A" and "B" trains and some of the Unit 0 annunciators. The inspectors verified the IPA met the requirements of BwAP 100-12. The shift operations supervisor led the IPA and stressed the importance of vigilance in monitoring equipment indicators for the plant systems normally served by the "N" train annunciators. The system engineer described the maintenance activity to be performed. The inspectors observed all necessary personnel involved in the maintenance activity were in attendance at the briefing.

The inspectors observed that the licensee augmented the shift with four additional non-licensed operators and four additional Nuclear Station Operators (NSOs). The non-licensed operators were stationed appropriately in the turbine and auxiliary buildings to monitor equipment. The additional NSOs were each assigned a specific section of the control boards for the purpose of continuously monitoring the indicators of equipment effected by the annunciator outage. The communication links between field personnel and the control room were tested and operable annunciator windows were identified prior to the commencement of the maintenance activity.

The inspectors observed the NSOs performing continuous monitoring of the control boards prior to the deenergization of the "N" train annunciator power supplies. The continuous monitoring of the control boards continued throughout the duration of the maintenance activity until testing had verified that the "N" train annunciators were again operable. Inspectors observed direct supervision of the NSOs by the Unit Supervisor (US) from within the at-the-controls area of the control room. The US provided the NSOs frequent reminders to maintain their focus on the control board indicators.

c. Conclusions

The inspectors concluded that the infrequently performed activity briefing of shift personnel for removal of the "N" annunciator train was conducted and attended by the appropriate personnel. The inspectors concluded that the licensee demonstrated an excellent safety focus by providing additional NSOs in the control room and additional non-licensed operators in the field to allow for continuous monitoring of critical plant equipment normally monitored by the unavailable annunciators. The inspectors concluded that the US demonstrated good supervisory presence by remaining in or near the at-the-controls area and provided continuous reminders to the NSOs to remain focused on the control board indicators. The inspectors concluded that the licensee's restoration and testing of the "N" train of control room annunciators was properly performed in accordance with established procedures. (Section O1.1)

O4 Operator Knowledge and Performance

O4.1 Observation of Operator Rounds

a. Inspection Scope (71707)

The inspectors observed non-licensed operators during the performance of their rounds in the turbine building and auxiliary building. The inspectors performed a review of "Equipment Operator Weekly Logs Logsheet," Revisions 10 and 11; "Auxiliary Building U-1 [Unit 1] Weekly Logs Logsheet," Revisions 9 and 10; "Auxiliary Building U-2 [Unit 2] Weekly Logs Logsheet," Revisions 8 and 9; "Turbine Building U-1 Weekly Logs Logsheet," Revisions 14 and 15; and "Turbine Building U-2 Weekly Logs Logsheet," Revisions 14 and 15. Inspectors discussed recent changes to the equipment operator logs with members of the operations staff, and discussed management expectations of field operator performance with the Shift Operations Supervisor (SOS).

b. Observations and Findings

On January 6, the inspectors accompanied an equipment operator performing rounds of the 1E and non-1E high voltage switchgear, 1E batteries, diesel generators, turbines, transformers, and the switchyard; and on January 7, the inspectors accompanied the Unit 1 auxiliary building operator while performing rounds of the auxiliary building. The inspectors made the following observations:

- the operators observed radiation protection, housekeeping, and fire protection requirements;
- the operators inspected lesser traveled areas of the plant as part of their rounds;

- the operators checked all standby, running, and safety-related equipment during their rounds; and

- the operators accurately measured equipment parameters and recorded the associated readings in their logs.

The inspectors were told by auxiliary building operators that the number of readings taken for the day shift logs had been reduced in September 1997. The inspectors reviewed new and old revisions of the equipment operator, auxiliary building, and turbine building logs. The comparison revealed that readings taken to satisfy Technical Specification (TS) requirements were obtained. The inspectors observed that the readings that were removed were associated with equipment that rarely experienced any significant change, provided little useful information to operators, or were associated with annunciated equipment. Many of the readings were moved from the day shift logs to either the midnight or the afternoon logs.

The inspectors discussed the abbreviation of the day shift logs with the operations staff and were told the reason for the abbreviation was to increase the availability of field operators for the support of plant activities and to respond to plant problems. The staff told the inspectors that they conducted a review of the logs and determined that there were many components with parameters that rarely changed or were only measured daily. The staff made the determination that these components could be adequately monitored by recording the parameters on the other shift logs. The staff told the inspectors that the changes to the logs were reviewed by all of the field supervisors prior to implementation and no parameters that were required to be recorded to satisfy TS requirements and other commitments were removed from the logs.

The inspectors discussed management's expectations of operator performance of rounds with the SOS. The SOS told the inspectors that the field operators were still expected to visit all areas and to look at all the equipment on their rounds. The SOS told the inspectors that several of the operators had expressed concerns with the abbreviation of the day shift equipment operator, auxiliary building, and turbine building logs. A shift manager was assigned to review the concerns raised by the operators but had not yet completed the review.

The inspectors did not observe any behavior by operators that would indicate the existence of operator workarounds. The inspectors noted that all areas visited as part of the rounds were accessible to operators and only a minimal number of contaminated areas were encountered.

c. Conclusion

The inspectors observed operators while they performed their required rounds and concluded that the operators properly checked the status of all the equipment; correctly adhered to radiation protection, housekeeping, and fire protection requirements; and accurately read and recorded the required equipment parameters. The inspectors reviewed the abbreviated day shift logs and concluded that readings required by TS or other commitments were obtained.

O5 Operator Training and Qualification

O5.1 Observation of Licensed Operator Requalification Simulator Training

a. Inspection Scope (71707)

The inspectors observed, in the plant simulator, the performance of licensed operators in response to a loss of a condensate pump, a loss of a component cooling water pump, steam generator tube rupture with a safety injection actuation, and a feedline break inside containment.

b. Observations and Findings

On January 14, 1998, the inspectors observed licensed operators participating in the licensee's licensed operator requalification program. The simulated scenarios observed by the inspector included: a loss of a condensate pump, a loss of a component cooling water pump, a steam generator tube rupture with a safety injection actuation, and a feedline break inside containment. The inspectors observed that the operating crew promptly identified the problems, properly used the correct procedures to stabilize the plant, continuously self-checked their actions prior to taking the actions, and effectively used communication techniques. The US provided directions to operators, conducted periodic crew briefings as permitted by plant conditions, and referred to TS and correctly identified and entered the applicable action statements. The shift technical advisor provided supervision over reactivity manipulations performed by the nuclear station operators. The shift manager referred to the Generating Station Emergency Plan (GSEP) and properly classified the events, upgraded and downgraded the events appropriately, and made the required notifications.

The inspectors observed that the simulator accurately represented the actual control boards in the control room. However, the inspectors observed that the existing problems with the potential for some of the Unit 1 and 2 feedwater check valves (1/2FW079A, B, C, and D) to stick open were not included in the simulator's modeling. The instructors told inspectors that they would discuss the issue at the next weekly operations training meeting.

c. Conclusion

The inspectors observed licensed operator requalification training and determined that operators promptly identified all of the off-normal and casualty events included in the training scenarios, properly used the correct procedures to place the plant in a stable condition, and used proper self-checking and communication techniques. Inspectors concluded that supervisory personnel provided directions to operators, conducted periodic crew briefings, effectively supervised reactivity manipulations, correctly identified and entered the applicable TS action statements, properly classified the GSEP events, appropriately upgraded and downgraded the GSEP events, and simulated the required notifications. The inspectors concluded that the simulator accurately represented the actual control boards in the control room.

O7 Quality Assurance in Operations

O7.1 10 CFR 50.54(f) Letter Commitment Review

a. Inspection Scope (92901)

The inspectors reviewed the status of commitments pertaining to the licensee's March 28, 1997, response to the NRC's request for information pursuant to 10 CFR 50.54(f). The commitment numbers correspond to those used by the licensee in their March 28, 1997, response.

b. Observations and Findings

b.1 Commitment 1: "To reinforce these principles and ensure that performance results are achieved, the Chief Nuclear Operating Officer (CNOO) conducts Management Review Meetings (typically each month) at each site." The licensee no longer has a management position entitled CNOO. This commitment was fulfilled by the Vice President of Pressurized Water Reactors.

Commitment 75: "The CNOO conducts Management Review Meetings at each site focused on safety performance and the effectiveness of improvement initiatives. These meetings address trends of safety, performance, and cost indicators; results of third party (NRC) inspections; results of site self-assessments; status of material condition in the plant; outage planning and performance; and assessments of the quality of workforce product and training."

Commitment 100: "We have established the actions to be taken if the performance criteria are not met. In order to assure that effective and timely actions are taken, assessment of performance indicators and implementation of actions based on this assessment will take place at the site, Nuclear Operating Division and Board levels. Each of the performance indicators described in Sections 4.7.1 and 4.7.2 [of the Licensee's 10 CFR 50.54(f) response] above will be monitored by the Site Vice Presidents, and will be reviewed during the periodic Management Review Meeting for each station."

Commitment 271: "The CNOO (typically monthly) conducts Management Review Meetings at each site, focusing on safety performance and the effectiveness of improvement initiatives."

Commitment 322: "Each month the CNOO conducts Management Review Meetings at all sites."

The inspectors observed one of the monthly Management Review Meetings conducted on January 12. Licensee management briefed the Vice President of Pressurized Water Reactors on the current status of performance indicators reported to the NRC as a response to the March 28, 1997, 10 CFR 50.54(f) letter to the utility. The Vice President made several comments regarding expectations of excellence from station management. The inspectors concluded that the commitments: to conduct a monthly Management Review Meeting and to reinforce management expectations; to discuss performance indicators, trends,

and the results of self assessments by third party inspectors; and to discuss the effectiveness of improvement initiatives at Braidwood were satisfied. Commitments 1, 75, 100, 271, and 322 are closed.

b.2 Commitment 54: "Our CNOO, during his periodic visits (typically monthly) to the sites, conducts open discussions with groups of 15 - 20 employees regarding our plans, and steps that can be taken to improve."

Commitment 316: "Our CNOO, during his monthly Management Review meetings at the sites, has discussions with groups of 15 - 20 employees regarding our plans, issues of concern, and steps for improvement."

The inspectors observed the Vice President of Pressurized Water Reactors discuss current station concerns with a group of 20 - 30 workers on January 12. The inspectors concluded that the commitment to meet with small groups of employees on a periodic basis at Braidwood was satisfied and Commitments 54 and 316 are closed.

c. Conclusion

The inspectors concluded that the licensee met Commitments 1, 54, 75, 100, 271, 316, and 322 regarding periodic management meetings.

II. Maintenance

M1 Conduct of Maintenance

M1.1 Miscellaneous Maintenance Activities

a. Inspection Scope (€2707)

Between December 31, 1997, and January 15, 1998, the inspectors observed all or portions of the following maintenance activities:

- Repair of relay PNLA30J within electrical cabinet 2PR30J in accordance with Work Request 970134937-01.
- Replacement of the process radiation monitor 1PR11J pump motor in accordance with BwHP 4006-011, "Electrical Maintenance Troubleshooting Work Sheet," Revision 9.
- Replacement of a mechanical seal on 2A residual heat removal system pump in accordance with BwMP 3110-015, "Residual Heat Removal Pump Disassembly, Inspection, and Reassembly," Revision 0.

b. Observations and Findings

The inspectors attended the heightened level of awareness and Infrequently Performed Activities (IPA) meetings. All maintenance related topics were discussed at the heightened level of awareness and IPA meetings including responsibilities, safety requirements, tooling required, communications, and contingency plans. The inspectors noted that maintenance personnel were knowledgeable about the scope of the work, the required system status, and electrical safety. The inspectors also reviewed the applicable portions of the Updated Final Safety Analysis Report (UFSAR) and the TS limiting conditions for operations and noted no conflicts with the planned work.

c. Conclusions

The inspectors concluded that the maintenance activities observed were performed in accordance with the applicable procedures, the procedures provided the requisite information for the assigned work, that maintenance personnel demonstrated safe work practices, and maintenance personnel were knowledgeable of the associated TS limiting condition for operations.

M1.2 Miscellaneous Surveillance Activities

a. Inspection Scope (61726)

The inspectors observed all or portions of the following surveillance tests:

- 2BwOS 6.2.3.a-1, "Reactor Containment Fan Cooler Monthly Surveillance," Revision 4E1.

- BwVS 7.6.h-1, "Control Room Recirculation Charcoal Adsorber Bank operability," Revision 5E1.

b. Observations and Findings

Between December 31 and January 9, the inspectors observed the performance of the above listed surveillance tests, both locally and from the control room. The inspectors observed operations personnel establish initial plant conditions for the surveillance tests, operate plant equipment, communicate between the control room and the auxiliary and containment buildings, and restore effected equipment to service. Operators correctly followed the surveillance test procedures, used proper three way communications, and properly performed independent verifications during equipment restoration. The inspectors observed that the acceptance criteria specified in the surveillance test procedures were met. The inspectors reviewed applicable sections of the UFSAR and the TS and determined that the surveillance tests verified that the systems performed as required.

c. Conclusions

The inspectors concluded that for observed surveillance activities acceptance criteria were met, personnel correctly followed the test procedures, and surveillance tests verified the systems performed as required by the USFAR and TS.

M2 Maintenance and Material Condition of Facilities and Equipment

M2.1 Unit 1 and Unit 2 Main Feedwater Check Valve FW079 Maintenance

a. Inspection Scope (62707)

The inspectors reviewed Problem Identification Form (PIF) A1997-05245, "Unable To Maintain U-2 Feedwater Pump Speed Controller In Auto"; completed work package 970008530-01, "steam generator 2C feedwater flow check valve disassemble and inspect during A2R06"; completed work package 970008531-01, "steam generator 2D feedwater flow check valve disassemble and inspect during A2R06"; BwMP 3305-087, "Borg-Warner FW079 Check Valve Disassembly, Inspection, and Reassembly," Revisions 4 and 5; Operability Determinations 97-156, 97-157, and 97-163; and completed documentation for surveillance test 2BwVS 0.5-2.FW.2-2, "Main Feedwater Header (2FW079A, B, C, D) Check Valve Full-Close Operability Exercise Test During Refuel Outages," Revision 0.

b. Observations and Findings

On November 26, 1997, the licensee identified that main feedwater check valves 2FW079C and D were not completely open with Unit 2 at 97 percent power. The inspectors reviewed the most recent complete work package documentation on the four feedwater check valves in both units.

The 2FW079A, B, C, and D valves were 16 inch tilting disc, anti-slam check valves in the main feedwater lines to all four steam generators. Hydraulic pistons provided resistance to prevent check valve slam. Testing of the check valves to verify closure was required by American Society of Mechanical Engineers Code, Section XI, Article IWV-3520 and by TS 4.0.5. Relief request VR-31 was granted by the NRC on August 18, 1995, to allow periodic inspection of the valves instead of quarterly flow checks.

The inspectors identified in the vendor manual a letter from Borg-Warner to ComEd dated June 26, 1992, that stated valve sticking could occur if there was not enough clearance (greater than .003 inches) between the outer diameter of the piston rod bushing and the inner diameter of the valve bonnet bore due to thermal expansion of the bronze piston rod bushing. The coefficient of thermal expansion for the bronze rod bushing was twice that of the steel of the valve bonnet. The bronze bushing would expand until it made contact with the valve bonnet and then stress relieve. When the bushing cooled down to about 250 to 300 degrees Fahrenheit during plant shutdown, the bronze bushing would contract to a diameter smaller than original. This would cause the piston rod bushing to collapse onto the piston rod causing the valve to stick open. The letter recommended that the licensee machine the bronze bushing outer diameter to a dimension of 3.992/3.993 inches. When questioned by the inspectors, the licensee provided documentation that stated that all four Unit 2 FW079 check valves were found stuck 100 percent open in November of 1989. Operability Evaluation 89-128 documented that the root cause of the sticking valves was insufficient clearance between the piston rod bushing outer diameter and the valve bonnet bore.

The inspectors reviewed the most recent work package and identified that the piston rod bushings for check valves 1FW079A and D were replaced in April and May of 1997 with

neither the inside nor the outside diameter of the bushing machined. The documentation lacked sufficient data to determine the clearance between the piston rod bushing and the piston rod. The licensee stated that check valves 1FW079A and D would most probably stick below 40 percent power based on predicted feedwater temperatures. The FW079 check valves were relied upon in UFSAR, Chapter 15.2.8, "Feedwater System Pipe Break," to provide immediate isolation of the steam generators to reduce the amount of inventory loss prior to the closure of the feedwater isolation valves. The licensee initiated an Operability Evaluation 97-163, which evaluated the three check valves sticking below 40 percent power. The licensee concluded that the feedwater system for both units was operable based on the isolation capability of the feed isolation valve.

The inspectors reviewed BwMP 3305-087, Revision 5. The licensee included acceptance criteria for the as-found valve position but did not include steps to measure and record the clearance between the piston rod bushing and the valve bonnet bore, and the clearance between the piston rod and the piston rod bushing.

BwAP 1250-2, "Deviation Reporting," Revision 2, Step C.1, defined a deviation as "a departure from accepted equipment performance...which results in, or could, if uncorrected, result in a failure of an item to perform as required by TS or approved procedures." Step C3.a.4 required that a person identifying a deviation initiate a deviation report. Step C.3.d.1 b required that any additional corrective action required to investigate, correct the condition, or to prevent the recurrence be determined and specified. The licensee did not prepare a deviation report nor initiate corrective actions that would preclude recurrence of the condition where the Unit 2 main feed water check valves stuck open.

As mentioned above, all four feedwater check valves on Unit 2 stuck open in 1989 due to a valve design problem. The failure to take corrective actions to prevent recurrence of a significant condition adverse to quality was a violation of 10 CFR Part 50, Appendix B, Criterion XVI (50-456/97022-01(DRP); 50-457/97022-01(DRP)).

c. Conclusion

The licensee identified in 1989 that all four Unit 2 main feedwater check valves (FW079A, B, C, and D) had seized in an open position due to insufficient clearances between critical components in the valve dampening mechanisms. The licensee did not change the design of the valve, did not include work package instructions to machine the rod piston bushing to the proper dimensions if replaced, did not include steps in the work package to measure and record critical clearance parameters, and did not include as-found acceptance criteria in the work package instructions that would identify a problem. The inspectors identified in December 1997 that critical components in the Unit 1 FW079A and D check valve dampening mechanisms were replaced in May and April of 1997 respectively without being machined to the required clearances. The inspectors concluded that the corrective actions taken because of the seizing of the FW079 check valve piston rods in 1989 were not adequate to prevent recurrence. A violation was issued.

M7 Quality Assurance in Maintenance Activities

M7.1 10 CFR 50.54(f) Letter Commitment Review

a. Inspection Scope (92902)

The inspectors reviewed the status of commitments pertaining to the Braidwood Station March 28, 1997, response to the NRC's request for information pursuant to 10 CFR 50.54(f). The following commitments related to work control were reviewed by the inspectors. The commitment numbers correspond to those used by the licensee in its March 28, 1997, response.

b. Observations and Findings

b.1 Commitment 48: "A standard screening process has been put in place at all six sites to ensure maintenance work is properly classified and prioritized."

The inspectors verified that a standard screening process was put in place at Braidwood by interviewing the work control center supervisor, reviewing NSWP-WM-08, "Action Request Screening Process," Revision 1, and attending a daily screening meeting. The inspectors concluded that the commitment to implement a standard screening process at Braidwood was satisfied and this item is closed.

b.2 Commitment 49: "Work Planning is being evaluated to identify inefficiencies in the planning process that prevent work from being performed."

The inspectors verified that the evaluation of the work planning process was a continuous process through an interview with the work control superintendent and the work control center supervisor. Braidwood station has a full time representative assigned to the company's corporate office to evaluate the work control process. The inspectors concluded that the commitment to evaluate the work planning process at Braidwood was satisfied and this item is closed.

b.3 Commitment 50: "All sites are currently implementing a minimal work request process which enhances job planning for minor work."

The inspectors verified that a minimal work request process was implemented by interviewing the work control superintendent and the work control center supervisor, and by reviewing nuclear station work procedure NSWP-WM-06, "Minor Maintenance Process," Revision 1. The nuclear station work procedure defined and established criteria for categorizing tool pouch and minor maintenance. The inspectors concluded that the commitment to implement a minimal work request process at Braidwood was satisfied and this item is closed.

b.4 Commitment 52: "The amount of emergent work completed by the Fix-It-Now (FIN) teams is measured to determine the effectiveness of the initiatives."

The inspectors reviewed the weekly report that compared emergent work tasks performed by the FIN team versus the emergent work tasks performed by the

maintenance shops. The licensee used the information to determine the proper size of the FIN team and also was able to determine that the amount of resource loading for the regular maintenance crews was too high based on the amount of emergent work that was performed by the shops. The inspectors concluded that the commitment to measure the amount of emergent work completed by the FIN team to evaluate the effectiveness of work planning initiatives at Braidwood was satisfied and this item is closed.

b.5 Commitment 225: "The Getting Work Done Plan used dedicated work teams (FIN team and a work analyst team) to reduce the backlogs and improve schedule adherence on work tasks. The FIN team is utilized to protect execution of the weekly schedule by assuming responsibility for all emergent work requirements that arise during the week."

The residents verified that a FIN team was implemented at Braidwood and work request backlogs were significantly reduced. The percent completion of the weekly schedule increased. However, the FIN team did not assume the responsibility for all emergent work. The FIN team works the day shift only and primarily performed jobs that could be completed in a single shift. Emergent work that required multiple shifts to complete was performed by maintenance shop personnel. The inspectors concluded that the commitment to use dedicated work teams to reduce work backlogs at Braidwood was satisfied and this item is closed.

c. Conclusion

The inspectors concluded that the licensee met Commitments 48, 49, 50, 52, and 225 regarding work control initiatives.

M7.2 Non-Outage Corrective Work Request Status Review

a. Inspection Scope (92902)

The inspectors reviewed the licensee's information on the non-outage corrective work request backlog and interviewed the work control superintendent and the work control center supervisor.

b. Observations and Findings

The number of non-outage corrective work requests was developed from the licensee's electronic work control system. The licensee screened all action requests and assigned each to a specific category. If the category data field was left blank, the computer automatically assumed that the work was non-outage corrective maintenance. Action requests were not hand written but entered into the computer by operations, maintenance, or engineering personnel.

c. Conclusions

The inspectors concluded that the licensee accurately identified, quantified, tracked, and reported the number of non-outage corrective work requests reported to the NRC as committed to in the Braidwood Station March 28, 1997, response to the NRC's request for information pursuant to 10 CFR 50.54(f).

M7.3 Measurement and Test Equipment (M&TE)

a. Inspection Scope (62707)

The inspectors monitored the licensee's controls of M&TE. The inspectors reviewed BwAP 400-4, "Control of Portable Measurement and Test Equipment," Revision 10E1. The inspectors monitored M&TE in use in the plant, as well as M&TE storage facilities. The inspectors also interviewed maintenance staff, system engineering, site engineering, and operations personnel.

b. Observations and Findings

BwAP 400-4, Step F.6.a.1.b, stated that "The M&TE storage facility will be locked when unmanned." The inspectors identified five occasions when this requirement was not satisfied, including:

- On November 26, 1997, the inspectors entered the hot tool room in the auxiliary building. The inspectors identified numerous calibrated torque wrenches, pressure gages and alignment tools that were left unlocked and unattended, contrary to the requirement of BwAP 400-4.

- On December 1, 2, and 3, the inspectors entered the hot tool room and observed additional examples of M&TE left unlocked and unattended, contrary to the requirements of BwAP 400-4.

- On December 12, the inspector entered the instrument maintenance department tool room located in the turbine building. M&TE stored in this room was left unlocked and unattended, contrary to requirements of BwAP 400-4.

The failure to follow Procedure BwAP 400-4 is a violation of TS 6.8.1.a. (50-456/97022-02(DRP); 50-457/07-22-02(DRP)) as described in the attached NOV.

c. Conclusions

The inspectors concluded that access to M&TE was not consistently controlled based on finding M&TE storage locations unlocked and unattended, on five separate occasions, which violated licensee M&TE storage control procedural requirements. A violation was issued.

III. Engineering

E2 Engineering Support of Facilities and Equipment

E2.1 Temporary Alterations

a. Inspection Scope (37550)

The inspectors reviewed temporary alteration processes. The inspectors reviewed documentation for several temporary alterations and performed plant walkdowns of several temporary alterations. Temporary alterations were reviewed for compliance with the UFSAR and TS requirements. The inspectors also reviewed Procedure BwAP 2321-18, "Temporary Alterations," Revision 3E1.

b. Observations and Findings

Review of the monthly temporary alteration report issued on December 29, 1997, revealed that there were 19 documented temporary alterations in the plant. Eight alterations had been in place for greater than 18 months. The report also showed that plans were in place to remove all temporary alterations or to take necessary actions in order to make the alteration a permanent modification.

The inspectors reviewed 10 CFR 50.59 safety evaluations for a sample of temporary alterations. The evaluations were performed correctly and referenced required licensing and design documents. The inspectors performed a walkdown of temporary alterations 93-1-010 and 93-2-019. The physical installation of the alterations was in agreement with the installation documentation.

The inspectors also looked for undocumented modifications to the plant while performing routine plant walkdowns. Two unauthorized plant modifications were identified. Steel buildings had been erected in the electrical penetration rooms for each unit. These structures were called "Local Leak Rate Test shacks" because they were used to store local leak rate test equipment. Although an exact date the steel buildings were installed could not be determined, plant personnel stated they were built in the late 1980s.

Upon discovering the two steel buildings, the inspectors checked to see if the structures were identified in plant documentation. UFSAR Section 1.2, Braidwood Fire Protection Report Section 2.3.11.49, and Plant Drawings M-6, M-7, A-256, A-258, S-1298, and S-1296 were reviewed. None of the documents included the structures. The inspectors reported this to the licensee. Site engineering personnel determined that the structures should not be in place. Since the buildings were installed close to numerous safety-related components, site engineering completed Operability Evaluation 98-002. The inspectors reviewed the evaluation for both buildings and considered it acceptable.

Both buildings were removed as of January 22. Site engineering management stated that site engineers were performing a review of plant facilities in order to identify any other unauthorized modifications. The failure to perform design analysis and to document the installation of the structures in the electrical penetration rooms for each unit is a violation of 10 CFR Part 50, Appendix B, Criterion III, Design Control (50-456/9702203(DRP); 50-457/9702203(DRP)).

c. Conclusions

The inspectors concluded that the licensee made progress toward reducing the total number of temporary alterations. System and site engineering personnel were tracking open temporary alterations as listed in the associated documentation. The inspectors concluded that plant procedures related to the temporary alteration process were followed for known plant alterations. However, the inspectors identified two unauthorized modifications that were in place for several years but were not identified in plant design documentation. A violation was issued.

E7 Quality Assurance in Engineering Activities

E7.1 10 CFR 50.54(f) Letter Commitment Review

a. Inspection Scope (92903)

The inspectors reviewed the status of commitments pertaining to the Braidwood Station March 28, 1997, response to the NRC's request for information pursuant to 10 CFR 50.54(f). The following commitments related to advanced engineering and configuration management training were reviewed by the inspectors. The commitment number corresponds to those used by the licensee in their March 28, 1997, response.

b. Observations and Findings

Commitment 24: "Additional training will be conducted to address identified areas for improvement such as design basis adherence, configuration management implementation, operability determinations, and safety evaluation preparation."

The inspectors interviewed the supervisor of the corporate design basis programs department to determine the scope of the training on safety evaluation preparation and who would be trained. The supervisor stated that advance training in 10 CFR 50.59 safety evaluation preparation would be conducted. This training will be completed in the summer of 1998 and will include information on design basis definition and adherence, and operability determination preparation. The primary target group for the training would be engineers with at least two years experience. The strategy for the training was to increase the knowledge level of about 30 to 40 engineers at each station and upgrade procedures at each station to include elements of the training. In mid-1998, the training for the rest of the engineering staff would include the 10 CFR 50.59 preparation procedural changes. The inspectors reviewed a course book for the training.

The inspectors also interviewed the supervisor of the corporate configuration management department to determine the scope of the training on configuration management and who would be trained. The supervisor stated that the training was targeted primarily for operators and maintenance workers that had the opportunity to make plant changes through their normal course of work. The training was designed to define what a plant change was, the importance of writing problem identification forms when changes were identified, and what the roles of operators and maintenance workers were in maintaining plant configuration control. The training was completed at Braidwood

in September 1997 for about 133 operators and 247 maintenance workers. The inspectors reviewed the training material and determined that the training given met the commitment.

c. Conclusion

The inspectors concluded that Commitment 24 to conduct additional training on identified areas for improvement such as design basis adherence, configuration management implementation, operability determinations, and safety evaluation preparation at Braidwood was satisfied and this item is closed.

IV. Plant Support

R7 Miscellaneous Radiation Protection and Control Issues

R7.1 Percent Contaminated Square Footage Review

a. Inspection Scope (71750)

The inspectors reviewed the licensee's information on the percent contaminated square footage and interviewed radiation protection personnel.

b. Observations and Findings

The percent of contaminated square footage was calculated from a list of all auxiliary building and fuel handling building rooms and the square footage of each room. The contaminated areas in the plant were estimated and compared to the total amount of square footage. Some areas, such as the containment, were exempted from the computation. The inspectors reviewed the exempt areas and the basis for why they were considered exempt and had no concerns. The inspectors also inspected the plant and had no concerns with the amount of square footage the licensee considered contaminated.

c. Conclusions

The inspectors concluded that the licensee accurately identified, quantified, tracked, and reported the percent of contaminated square footage reported to the NRC as committed to in the Braidwood Station March 28, 1997, response to the NRC's request for information pursuant to 10 CFR 50.54(f).

F4 Fire Protection Staff Knowledge and Performance

F4.1 Fire Drill

a. Inspection Scope (71750)

The inspectors observed a fire drill at the plant. The inspectors also attended the fire drill critique session.

b. Observations and Findings

At 11:05 a.m. on December 31, the licensee staged a fire drill in the turbine building trackway. The drill scenario was a simulated forklift fire and an assumed out-of-service fire sprinkler system for the affected area.

The drill was announced on the plant page system at 11:06 a.m. The fire chief arrived on the scene at 11:08 a.m. and the full fire brigade was on the scene at 11:12 a.m. All fire brigade members reported to the scene wearing fire turn-out gear. One fire brigade member also reported with a self-contained breathing apparatus (SCBA). Several additional operators also reported to the scene in order to provide support for the fire brigade members. Security personnel were at the scene to provide access control.

Actions simulated were appropriate in order to control the fire and to limit the effects of the fire on plant equipment. The fire chief and operations supervisors assessed possible problem areas. All equipment brought to the fire was observed to be in good condition and all inspections (when required) were up to date. Fire personnel brought additional hoses, SCBAs, fire extinguishers, and a foam unit to the scene. Following the drill, all equipment was returned to storage.

Following the drill, the fire marshall presented a critique session for all personnel that responded. Potential areas for improvement and the drill scenario were discussed. Fire brigade members and operating personnel actively participated in the meeting.

c. Conclusions

Plant personnel response to the fire drill was prompt and thorough. Fire brigade members performed (or simulated) all tasks well with a positive attitude.

V. Management Meetings

X1 Exit Meeting Summary

The inspectors presented the inspection results to members of licensee management at the conclusion of the inspection on January 26, 1998. The licensee acknowledged the findings presented. The inspectors asked the licensee whether any materials examined during the inspection should be considered proprietary. No proprietary information was identified.

PARTIAL LIST OF PERSONS CONTACTED

Licensee

T. Tulon, Site Vice President
*K. Schwartz, Station Manager
*R. Wegner, Operations Manager
*R. Byers, Maintenance Superintendent
A. Haeger, Health Physics and Chemistry Supervisor
*R. Graham, Work Control Superintendent
*T. Simpkin, Regulatory Assurance Supervisor
*C. Dunn, System Engineering Supervisor
*J. Meister, Engineering Manager
*B. Boyle, Fire Marshal
*J. Nalewajka, Integrated Safety Engineering Group
*J. Neyhart, Shift Manager
*C. Herzog, Executive Assistant
*M. Cassidy, Regulatory Assurance - NRC Coordinator

NRC

*M. Jordan, Chief, Reactor Projects Branch 3
*C. Phillips, Senior Resident Inspector
*J. Adams, Resident Inspector
D. Pelton, Resident Inspector

IDNS

*T. Esper

* Denotes those who attended the exit interview conducted on January 26, 1998.

INSPECTION PROCEDURES USED

IP 37550:	Onsite Engineering
IP 61726:	Surveillance Observations
IP 62707:	Maintenance Observation
IP 71707:	Plant Operations
IP 71750:	Plant Support Activities
IP 92901:	Followup - Plant Operations
IP 92902:	Followup - Plant Maintenance
IP 92903:	Followup - Engineering

ITEMS OPENED, CLOSED, AND DISCUSSED

Opened

50-456/97022-01; 50-457/97022-01	VIO	failure to take corrective actions
50-456/97022-02; 50-457/97022-02	VIO	failure to follow procedure
50-456/97022-03; 50-457/97022-03	VIO	failure to perform design analysis

LIST OF ACRONYMS USED

CNOO	Chief Nuclear Operating Officer
CFR	Code of Federal Regulations
FIN	Fix-It-Now
GSEP	Generating Station Emergency Plan
IPA	Infrequently Performed Activity
M&TE	Measuring and Test Equipment
NRC	Nuclear Regulatory Commission
NRR	Nuclear Reactor Regulations
NSO	Nuclear Station Operator
PDR	Public Document Room
PIF	Problem Identification Form
RP&C	Radiological Protection & Chemistry
SCBA	Self-contained Breathing Apparatus
SOS	Shift Operations Supervisor
TS	Technical Specification
UFSAR	Updated Final Safety Analysis Report
US	Unit Supervisor
VIO	Violation