

U.S. NUCLEAR REGULATORY COMMISSION

REGION III

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Report No: 50-456/99019(DRP); 50-457/99019(DRP)

Licensee: Commonwealth Edison Company

Facility: Braidwood Nuclear Plant, Units 1 and 2

Location: 35100 S. Route 53
Suite 84
Braceville, IL 60407-9617

Dates: December 21, 1999, through January 25, 2000

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Approved by: Michael J. Jordan, Chief
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EXECUTIVE SUMMARY

Braidwood Nuclear Plant, Units 1 and 2 NRC Inspection Report 50-456/99019(DRP); 50-457/99019(DRP)

This inspection included aspects of licensee operations, maintenance, engineering, and plant support. The report covers a 6-week period of resident inspection from December 21, 1999, through January 25, 2000.

Operations

- The inspectors concluded that operators routinely performed good turnover briefings, control board operations, response to alarms, and three-way communications. The control room operators were attentive to critical parameters associated with the systems being tested and kept the unit nuclear station operator and the unit supervisor informed of plant changes. The unit supervisors demonstrated good performance in the minimization of control room distractions, in the direction of personnel, in the conduct of briefings, and in the control of evolutions. (Section O1.1)
- The inspectors concluded that the licensee was prepared for the year 2000 transition with written action plans, contingency plans, and the appropriate staffing of personnel. The plant responded as expected and no problems occurred at the Braidwood site that impacted plant operations, plant security, or off-site power source stability. (Section O2.1)
- The inspectors reviewed the licensee's preparations for cold weather operation and concluded that station's safety-related equipment was configured in accordance with the freezing weather protection surveillance procedure. (Section O2.2)
- The inspectors observed operators perform a return-to-service of the 1B residual heat removal pump and concluded that the method of independent verification prescribed by the work execution center supervisor during the pre-job briefing and used by the operators during the pumps restoration was contrary to the station administrative procedure. Based on the review of recent NRC and Nuclear Oversight assessments, inspectors concluded that operations management personnel were ineffective in ensuring that verification procedure guidance was consistently applied over the last 6 months during the removal and return-to-service of some safety-related equipment. (Section O4.1)

Maintenance

- The inspectors observed the performance of five surveillance tests. The inspectors concluded that the surveillance tests adequately tested the system, the operators followed the procedures, and that the procedures included the required testing discussed in the Technical Specifications. The inspectors also concluded that appropriate actions were taken by the licensee in regards to the 1A emergency diesel generator erratic output frequency observed during the performance of surveillance testing. (Section M1.1)

The inspectors concluded that the licensee utilized good maintenance work practices during the observed portions of the replacement of the inboard and outboard mechanical seals on the 1B centrifugal charging pump and the overhaul of the 1SI8812B valve actuator. However, during post maintenance operation of the 1B charging pump, approximately a quart of oil sprayed from the pump's thrust bearing due to a missing thermocouple. The inspectors concluded that this event was the result of poor maintenance work practices and poor planning. (Section M1.2)

Two centrifugal charging pumps and two essential service water pumps had degraded material condition. Three of the four pumps had adequate operability evaluations and all had plans for repair. The 1A SX pump did not have a problem identification form which documented a prompt determination of operability. The licensee later determined that the 1A essential service water pump was operable. (Section M2.1)

Engineering

The inspectors concluded that the three operability determinations reviewed reflected good engineering judgement and safety focus, compensatory actions were understood by operations personnel, and corrective actions were entered into the station's action tracking system. (Section E1.1)

Plant Support

The inspectors concluded that radiologically controlled areas were properly posted, and locked high radiation area doors were locked and properly controlled by radiation protection personnel. The inspectors concluded that proper radiation work practices were used by maintenance and operating personnel while working in contaminated areas. (Section R1.1)

The inspectors reviewed the results of Unit 1 and Unit 2 chemical analysis required by Technical Specifications for the period from November 1, 1999, through January 15, 2000. The inspectors concluded that the results of all analyses met Technical Specification acceptance criteria and the results were clearly documented. (Section R1.2)

The inspectors concluded that the protected area fence, isolation zone, and alarm station equipment were properly maintained. Plant personnel followed security requirements for vital area entrance and exit. (Section S2.1)

The inspectors concluded that fire alarm panels, fire suppression equipment, emergency lights, and fire barriers were properly maintained and if needed should perform their functions. The inspectors concluded that combustible materials were properly controlled or eliminated from safety-related areas of the plant. Hot work (welding) was also controlled in accordance with plant procedures. (Section F1.1)

Report Details

Summary of Plant Status

Both units operated at or near full power for the entire period.

I. Operations

O1 Conduct of Operations

O1.1 Routine Control Room Observations

a. Inspection Scope (71707)

The inspectors observed the conduct of operation during normal operating conditions and during the performance of surveillance tests. The inspectors interviewed nuclear station operators, unit supervisors, and shift managers with regard to the ongoing activities.

b. Observations and Findings

The inspectors observed control room operators at different times throughout the inspection period. The inspectors noted that the nuclear station operators were attentive, used operating procedures, used self-checks when manipulating equipment, obtained peer-checks when required, and used three-way communications. The operators promptly addressed alarms, referred to the annunciator response procedures, and informed supervisors of alarms. During the performance of surveillance tests, operators with specific testing responsibilities demonstrated a heightened-level-of-attentiveness to critical parameters associated with the systems being tested. For example, during the performance of surveillance tests on the 1A diesel generator, the operator assigned to run the diesel generator promptly recognized fluctuations in the diesel generator frequency.

The inspectors noted that unit supervisors minimized control room distractions, clearly directed personnel, clearly communicated personnel assignments shift briefings, and effectively controlled evolutions. The inspectors found supervisors knowledgeable of the unit's status and ongoing activities.

c. Conclusions

The inspectors concluded that operators routinely performed good turnover briefings, control board operations, response to alarms, and three-way communications. The control room operators were attentive to critical parameters associated with the systems being tested and kept the unit nuclear station operator and the unit supervisor informed of plant changes. The unit supervisors demonstrated good performance in the minimization of control room distractions, in the direction of personnel, in the conduct of briefings, and in the control of evolutions.

O2 Operational Status of Facilities and Equipment

O2.1 Control Room Observations During The Year 2000 (Y2K) Transition

a. Inspection Scope (71707)

The inspectors observed the activities in the control room preceding, during, and following the transition to the year 2000. The inspectors also observed activities in the Technical Support Center preceding and following the transition to the year 2000. Inspectors attended Y2K briefings, reviewed Y2K contingency plans, and observed the implementation of the licensee's action plan.

b. Observations and Findings

The inspectors observed plant performance from the control room preceding, during, and following the transition to the year 2000. The inspectors noted no abnormal performance of plant equipment. The inspectors closely monitored the off-site power source voltage and frequency noting no instability. Contingency actions implemented by the licensee were recognized as necessary prior to the transition and sufficient personnel and written contingency plans were available to promptly implement those actions. The inspectors determined that there were no unexpected problems that impacted plant operations, plant security, or off-site power source stability.

c. Conclusions

The inspectors concluded that the licensee was prepared for the year 2000 transition with written action plans, contingency plans, and the appropriate staffing of personnel. The plant responded as expected and no problems occurred at the Braidwood site that impacted plant operations, plant security, or off-site power source stability.

O2.2 Cold Weather Preparations

a. Inspection Scope (71714)

The inspectors verified the licensee actions taken to protect safety-related systems against cold weather. The inspectors reviewed Braidwood Operating Surveillance Procedure BwOS XFT-A1, "Freezing Temperature Equipment Protection Annual Surveillance," Revision 5E2.

b. Observations and Findings

The inspectors reviewed the completed procedure 0BwOS XFT-A1. The inspectors noted that the procedure adequately addressed safety-related equipment vulnerable to freezing conditions. The inspectors noted that the licensee verified equipment exposed to cold weather was protected from freezing. The licensee ensured that heat tracing and heating circuits were energized, and thermostats were properly set.

c. Conclusions

The inspectors reviewed the licensee's preparations for cold weather operation and concluded that station's safety-related equipment was configured in accordance with the freezing weather protection surveillance procedure.

O4 **Operator Knowledge and Performance**

O4.1 Verification Practices

a. Inspection Scope (71707)

The inspectors observed operators perform a return-to-service of the 1B residual heat removal pump on January 5, 2000. The inspectors also reviewed Inspection Report 99010, Nuclear Oversight Assessment NOA-20-99-OP41, "Operations-Configuration Control," and administrative procedure OP-AA-101-106, "Verification Practices," Revision 0.

b. Observations and Findings

The non-licensed operators that performed the return-to-service used the concurrent verification method to remove the tags and restore the system lineup. The concurrent verification method consisted of two operators independently verifying the correct piece of equipment at the same time. The work execution center supervisor prescribed the concurrent verification method during the pre-job briefing for the return-to-service. However, OP-AA-101-106, Step 4.3.1 stated, "Perform concurrent verification on all breakers, valves, fuses, lifted leads, jumpers, and other components as listed below or as designated by the Operations Manager or designee; when mis-manipulation could result in an immediate threat to safe and reliable operation"; and Step 4.4.1 stated in part, "perform independent verification in situations when the placement and removal of out-of-services on safety-related equipment for which concurrent verification is not required." The independent verification method consisted of two operators verifying the correct piece of equipment at different times. The return-to-service of the 1B residual heat removal system had no line up changes that would have resulted in an immediate threat to safe and reliable operation had an initial mistake been made. The inspectors concluded that an independent verification method for the return-to-service should have been used based on procedural guidance in OP-AA-101-106. The inspectors spoke with the work execution center supervisor, that assigned the work, who later agreed with this conclusion. Operations management personnel stated that this issue was discussed with shift managers during a recent staff meeting and that new procedural guidance was pending which would result in retraining all operations department personnel in verification practices.

Inconsistent understanding and use of verification practices was previously identified in Inspection Report 50-456/457/99010 conducted in July 1999, and in Nuclear Oversight Assessment NOA-20-99-OP41, conducted in October 1999. The regular use of the concurrent verification method instead of the independent verification method had the potential to allow operators to distract one another while hanging or clearing out-of-

service tags. This failure constitutes a violation of minor significance and is not subject to formal enforcement action.

c. Conclusions

The inspectors observed operators perform a return-to-service of the 1B residual heat removal pump and concluded that the method of independent verification prescribed by the work execution center supervisor during the pre-job briefing and used by the operators during the pumps restoration was contrary to the station administrative procedure. Based on the review of recent NRC and Nuclear Oversight assessments, inspectors concluded that operations management personnel were ineffective in ensuring that verification procedure guidance was consistently applied over the last 6 months during the removal and return-to-service of some safety-related equipment.

II. Maintenance

M1 Conduct of Maintenance

M1.1 Observation of Miscellaneous Surveillance Activities

a. Inspection Scope (61726)

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

- 1BwOSR 5.5.8.RH-2B, "Train B Residual Heat Removal Valve Indication Test 18 Month Surveillance," Revision 0;
- 1BwOSR 5.5.8.RH-3B, "Residual Heat Removal System Train B Valve Stroke Quarterly Surveillance," Revision 0;
- 1BwOSR 3.8.1.2-1, "Unit 1 1A Diesel Generator Operability Monthly and Semi-Annual Surveillance," Revision 1E1;
- Braidwood Unit 1 Engineering Surveillance Procedure 1BwVSR 5.5.8.RH-2, "American Society of Mechanical Engineering Surveillance Requirements for Residual Heat Removal Pump 1RH01PB," Revision 0; and
- BwOSR 3.3.2.7-619, "Unit 1 Engineered Safety Features Actuation System Instrument Slave Relay Surveillance," Revision 0;

b. Observations and Findings

The inspectors observed the performance of the first four surveillance tests listed above. For each surveillance test, the inspectors observed the establishment of initial conditions required for the surveillance test, the operation of equipment, the communications between the licensed operators in the control room and non-licensed operators in the auxiliary building, and the restoration of affected equipment. The inspectors determined

that each of these activities were performed in accordance with the applicable procedure. The inspectors reviewed the data obtained during the surveillance tests and noted that it met the required acceptance criteria specified in the surveillance test procedures. The inspectors also reviewed the associated portions of the Updated Final Safety Analysis Report and the Technical Specifications and determined that the surveillance test procedures demonstrated the systems performed as designed.

The performance of BwOSR 3.3.2.7-619 results in an automatic slave relay start of the 1A emergency diesel generator (EDG). During this surveillance test, the licensee identified that the output frequency of the 1A EDG was behaving erratically which prompted the unit supervisor to direct the EDG to be tripped. The EDG was not aligned to safeguards buses at that time. The inspectors observed the licensee's actions taken to troubleshoot and correct this 1A EDG frequency issue. The inspectors determined that the licensee took prompt actions to declare the EDG inoperable; entered the appropriate Technical Specification limiting conditions for operations; and assigned "around the clock" coverage by engineering, maintenance, and operations personnel. The inspectors determined that these actions allowed the licensee to quickly identify the cause of the erratic frequency (loose wires between the mechanical and electrical governors), determine the extent of condition (inspected the three remaining EDGs and found no other loose wires), and return the 1A EDG to operable status.

c. Conclusions

The inspectors observed the performance of five surveillance tests. The inspectors concluded that the surveillance tests adequately tested the system, the operators followed the procedures, and that the procedures included the required testing discussed in the Technical Specifications. The inspectors also concluded that appropriate actions were taken by the licensee in regards to the 1A EDG erratic output frequency observed during the performance of surveillance testing.

M1.2 Maintenance Activity Observations

a. Inspection Scope (62707)

The inspectors reviewed the following Braidwood station procedures:

- NSWP-G-01, "Preparation and Processing of Work Packages," Revision 4;
- NSWP-WM-10, "Preparation of Maintenance Work Packages," Revision 3.
- Braidwood Administrative Procedure BwAP 400-9, "Maintenance Alterations," Revision 5;
- BwAP 330-1, "Station Equipment Out of Service Procedure," Revision 29E1;
- Braidwood Maintenance procedure BwMP 3110-004, "Centrifugal Charging Pump Inboard Bearing Mechanical Seal Rebuild," Revision 3E1; and

- BwMP 3110-005, "Centrifugal Charging Pump Outboard Bearing Mechanical Seal Rebuild," Revision 2.

The inspectors observed all or portions of the following maintenance activities:

- Replacement of the inboard and outboard mechanical seals on the 1B centrifugal charging pump in accordance with work request 980099996-01;
- Removal and reinstallation of thermocouples in support of the 1B centrifugal charging pump seal replacement; and
- Calibration of 1B centrifugal charging pump thermocouples in accordance with work request 980099750-01; and
- Overhaul of the 1SI8812B residual heat removal suction valve motor operated actuator, 99016475-01.

b. Observations and Findings

The inspectors generally observed good maintenance work practices during the replacement of the inboard and outboard mechanical seals on the 1B centrifugal charging pump and the overhaul of the 1SI8812B valve actuator. The inspectors attended the heightened-level-of-awareness meetings; reviewed the above work packages; reviewed high-risk work check sheets; walked down the work areas with maintenance personnel; questioned personnel concerning the scope of the work, including system status and precautions for electrical safety; observed the establishment of required system conditions; observed the use of foreign material exclusion controls; and observed the use of quality control "hold points." The inspectors reviewed the associated Technical Specifications limiting conditions for operation and reviewed the control room logs for limiting conditions for operation entry and exit log entries, when applicable. Finally, the inspectors walked down the out-of-service and discussed on-line risk significance with maintenance and operations department personnel. However, during post maintenance operation of the 1B centrifugal charging pump's auxiliary oil pump, the licensee observed oil spraying (approximately 1 quart) from the 1B charging pump thrust bearing. The licensee determined that the thrust bearing thermocouple, 1TE-CV002E, had not been reinstalled prior to the pumps return-to-service.

On review of the licensee's investigation, the inspectors determined that maintenance personnel failed to follow two procedures resulting in the failure to reinstall the thrust bearing thermocouple, 1TE-CV002E. Braidwood Technical Specification 5.4.1.a required that written procedures shall be established, implemented, and maintained covering the applicable procedures recommended in Regulatory Guide 1.33, Revision 2, Appendix A, February 1978. Regulatory Guide 1.33, Revision 2, Appendix A, February 1978, Section 1, Subsection (c), recommends administrative procedures for equipment control; and Section 9, Subsection (a), recommends procedures for maintenance that can affect the performance of safety-related equipment.

Procedure BwMP 400-9, "Maintenance Alterations," Revision 5, Section A, stated, in part, that the usage of this procedure is mandatory when equipment is altered or when realignment occurs during the course of repair, replacement, or troubleshooting. Paragraph D.4 states, in part, that removals and disassembly shall be documented on form BwAP400-9T1. Additionally, BwAP 330-1, "Equipment Out of Service Procedure," Revision 29E1, paragraph D.5.g.2, required that prior to releasing an out-of-service for final clear, the holder shall ensure that their specific work is complete and ensure correct status.

On December 7, 1999, during the seal replacement on the 1B centrifugal charging pump, mechanical maintenance personnel failed to follow the procedural requirements of BwMP 400-9 when maintenance personnel removed the thrust bearing thermocouple, 1TE-CV002E, without documenting its removal on form BwAP 400-9T1; and on December 9, 1999, when a mechanical maintenance department supervisor failed to follow procedural requirements of BwAP 330-1 when the supervisor did not ensure that removed thrust bearing thermocouple, 1TE-CV002E, had been reinstalled prior to releasing the OOS for final clearance. These failures constitute two examples of a violation of minor significance and are not subject to formal enforcement action.

The licensee identified additional weaknesses that contributed to this event including poor planning by the instrument maintenance work planner in having inadvertently left the removal and reinstallation of the thermocouple out of the original work request, inconsistent maintenance work procedures regarding the rebuilding of mechanical seals, and poor follow-up by the mechanical maintenance supervisor after having given verbal direction to a mechanic to remove the thermocouple.

c. Conclusions

The inspectors concluded that the licensee utilized good maintenance work practices during the observed portions of the replacement of the inboard and outboard mechanical seals on the 1B centrifugal charging pump and the overhaul of the 1SI8812B valve actuator. However, during post-maintenance operation of the 1B charging pump's auxiliary oil pump, approximately a quart of oil sprayed from the pump's thrust bearing due to a missing thermocouple. The inspectors concluded that this event was the result of poor maintenance work practices, poor planning, and two examples of individuals who failed to follow station procedures.

M2 Maintenance and Material Condition of Facilities and Equipment

M2.1 Material Condition Problems

a. Inspection Scope (62707)

The inspectors noted degraded material condition on four safety-related pumps. The inspectors discussed the operability of the 1A essential service water pump, and the licensee's planned corrective actions for the 1B and 2B chemical volume control pumps, and the 1A and 1B essential service water pumps with licensee management.

b. Observations and Findings

The inspectors reviewed the condition of three degraded safety-related pumps on Unit 1 and one on Unit 2. The 1B and 2B chemical and volume control (CV) charging pumps; and the 1A and 1B essential service water pumps.

The 1B CV pump had outboard seal leakage of 0.411 gallons per minute and seal flushing supply leakage of 11 drops per minute and the 2B CV pump had outboard seal leakage of 0.342 gallons per minute. Both were in excess of the Technical Specification 5.5.2 and Technical Requirements Manual, Appendix B acceptance criteria of 3,910 cubic centimeters per hour (0.017 gallons per minute) per unit for leakage outside containment. The licensee performed operability evaluations as required by the Technical Specifications and determined that the pumps were operable as long as total leakage outside containment did not exceed 1 gallon per minute per unit. The basis for operability was based on the ability of the filtered ventilation system to clean up auxiliary building atmosphere so that 10 CFR Part 19 and Part 100 limits for radiation exposure due to an accident condition would not be exceeded. The inspectors reviewed the operability evaluations (Section E1.1) and had no concerns. The licensee was monitoring the leakage on both pumps every shift to determine if there was any further degradation. Seal leakage on the CV pumps was a recurring problem. The licensee was preparing modifications to both pumps to attempt to minimize the leakage.

The 1A essential service water pump had an unquantified amount of seal leakage. There were catch basins assembled to prevent water from being flung around the room and the pump skid base plate was overflowing onto the floor. Licensee personnel wrote an action request to repair the leakage on October 26, 1999, and were also monitoring the seal leakage for further degradation. The seal leakage was scheduled for repair during the spring 2000 refueling outage. However, the licensee did not generate a problem identification form to document an operability evaluation and therefore there was no documented acceptance criteria against which to monitor. A discussion with shift management personnel indicated that the operators were expected to use their own judgement to determine if the seal leakage had gotten out of control. The essential service water system is not connected to the primary system, therefore, this leakage is not considered part of the 1 gallon per minute per unit limit identified above

Title 10 CFR Part 50, Appendix B, Criterion XVI, "Corrective Actions," states, in part, that "Measures shall be established to assure that conditions adverse to quality, such as failures, malfunctions, deficiencies, defective material and equipment, and nonconformance, are promptly identified and corrected.

Nuclear Station Procedure NSP-AP-4004, "Corrective Action Program Procedure," Revision 4, Step A.1, stated, "This procedure defines the requirements for the ComEd Nuclear Generation Group Corrective Action Program, and establishes the requirements for documenting and resolving problems, including degraded and nonconforming adverse conditions, identified on Problem Identification Forms." Step E.1.1.2 stated, "All Nuclear Generation Group personnel and contractors should initiate an Attachment A, "Problem Identification Form," when a condition adverse to quality is recognized." Step E.1.3.3.6, stated that once a problem identification form was written the shift

manager should, "Perform an operability determination; include a statement on the operability of the system or component, any immediate or compensatory corrective actions performed, and disposition of any degraded equipment."

Nuclear Station Procedure NSP-CC-3001, "Operability Determination Process," Revision 0, Section 3.1, stated, in part, "Once a degraded or nonconforming condition of a structure, system, or component is identified, prompt operability determination should be made as soon as possible consistent with the safety importance of the structure, system, or component affected." The specific conclusion on operability should be documented directly on the problem identification form.

On October 26, 1999, licensee personnel identified a degraded condition on the 1A essential service water pump and did not write a problem identification form, make a prompt operability determination, nor document the conclusion of operability on a problem identification form. This failure constitutes a violation of minor significance and is not subject to formal enforcement action.

The 1B essential service water pump demonstrated a trend in degrading pump differential pressure performance during American Society of Mechanical Engineers surveillance testing. The licensee made preparations to change the pump impeller but elected to lower the test acceptance criteria by a procedural change process to put the maintenance off until the Unit 1 refueling outage in the spring of 2000. The inspectors reviewed the acceptance criteria change and had no further concerns.

c. Conclusions

Two centrifugal charging pumps and two essential service water pumps had degraded material condition. Three of the four pumps had adequate operability evaluations and all had plans for repair. The 1A essential service water pump did not have a problem identification form which documented a prompt determination of operability. The licensee later determined that the 1A essential service water pump was operable.

III. Engineering

E1 **Conduct of Engineering**

E1.1 Operability Evaluation Reviews

a. Inspection Scope (37551)

The inspectors reviewed the following documents:

- Operability Evaluation 99-025, "Component Cooling Water Relief Valve American Society of Mechanical Engineers Code Compliance";
- Operability Evaluation 99-028, "1B Safety Injection Pump Insufficient Minimum Flow";

- Operability Evaluation 99-029, " Excessive1B Charging Pump Seal Leakage";
- NSP CC-3001, "Operability Determination Process," Revision 0;
- Braidwood Operating Procedure BwOP CC-8, "Isolation of Component Cooling Water Between Units 1 and 2," Revision 13;
- BwOP CC-10, "Alignment Of The 0 Component Cooling Water Pump To A Unit," Revision 12;
- BwOP CC-14, "Post Loss of Offsite Coolant Accident Alignment Of The Component Cooling Water System," Revision 8; and
- Ingersoll-Dresser Pump Company letter, dated November 5, 1999, Engineering Request Number 9902131, "Minimum Flow Tolerances."

b. Observations and Findings

The inspectors verified that the documentation of operability determinations met the requirements of NSP-CC-3001, that the assumptions used to develop the determinations were valid, and that individuals who prepared and reviewed operability determinations were properly trained and the licensee complied with Technical Specification requirements. The inspectors discussed compensatory actions with control room operations personnel and determined that operators were aware of, and understood the compensatory actions listed. The inspectors also determined that corrective actions listed had been entered into the licensee's nuclear tracking system.

c. Conclusions

The inspectors concluded that the three operability determinations reviewed reflected good engineering judgement and safety focus, compensatory actions were understood by operations personnel, and corrective actions were entered into the station's action tracking system.

IV. PLANT SUPPORT

R1 Radiological Protection and Chemistry (RP&C) Controls

R1.1 Radiological Controls

a. Inspection Scope (71750)

Throughout the inspection period, inspectors observed the posting of radiation areas, the control of locked high radiation areas, the application of as-low-as-reasonably-achievable principles, and the radiation work practices of station personnel. The

inspectors reviewed Braidwood Radiation Protection Procedure BwRP 5010-1, "Radiological Posting and Labeling Requirements," Revision 9E1 and discussed radiological postings with radiological protection department personnel.

b. Observations and Findings

The inspectors verified the postings of radiologically controlled areas and noted that these areas were posted in accordance with station procedures for the condition that existed in the areas. Rope boundaries, swing gates and signs were properly maintained. The inspectors verified that locked high radiation area doors were locked and were properly controlled by radiation protection personnel.

The inspectors observed proper radiation worker practices by plant personnel during the performance of work on the 1B charging pump, the 1A containment spray pump, and during the return-to-service of the 1B residual heat removal pump. For example, workers properly donned and removed anti-contamination clothing, properly performed frisking on exit from the contaminated area, and properly wore and monitored dosimetry.

c. Conclusions

The inspectors concluded that radiologically controlled areas were properly posted, and locked high radiation area doors were locked and properly controlled by radiation protection personnel. The inspectors concluded that proper radiation work practices were used by maintenance and operating personnel while working in contaminated areas.

R1.2 Review of Chemical Analyses Required by Improved Technical Specification

a. Inspection Scope (71750)

The inspectors reviewed results of the following Unit 1 and Unit 2 chemical analyses and their associated Technical Specifications:

- reactor coolant system (RCS) dose equivalent iodine;
- RCS gross specific activity;
- RCS anion concentration;
- RCS dissolved oxygen;
- safety injection accumulator boron concentration;
- reactor water storage tank born concentration;
- spray additive solution concentration;

- secondary specific activity; and
- spent fuel pool boron concentration.

The inspectors discussed the results of the previously listed analyses with chemistry personnel.

b. Observations and Findings

The inspectors reviewed the results of chemical analyses required by Technical Specification for the period from November 1, 1999, through January 15, 2000. The inspectors compared the chemical analyses results to the applicable Improved Technical Specification acceptance criteria and noted that all chemical analyses met their associated acceptance criteria. The results of the chemical analyses were clearly documented by chemistry personnel.

a. Conclusions

The inspectors reviewed the results of Unit 1 and Unit 2 chemical analysis required by Technical Specifications for the period from November 1, 1999, through January 15, 2000. The inspectors concluded that the results of all analyses met Technical Specification acceptance criteria and the results were clearly documented.

S2 Status of Security Facilities and Equipment

S2.1 Security Controls

a. Inspection Scope (71750)

The inspectors observed vital area controls, observed operation of alarm station equipment, verified the integrity of the protected area boundary, and verified the maintenance of the isolation zone.

b. Observations and Findings

The inspectors walked down the protected area fence and determined the fence had no uncontrolled openings, and was not damaged or degraded. The inspectors observed that the established isolation zone was free of foreign materials. The inspectors verified the proper operation of the security alarm station equipment. The inspectors observed personnel entering and exiting vital areas and determined that proper entry and exit requirements were followed and the installed security equipment functioned as intended.

c. Conclusions

The inspectors concluded that the protected area fence, isolation zone, and alarm station equipment were properly maintained. Plant personnel followed security requirements for vital area entrance and exit.

F1 Control of Fire Protection Activities

F1.1 Fire Protection Observations

a. Inspection Scope (71750)

The inspectors reviewed the as-found condition of fire alarm panels, fire suppression equipment, emergency lights, and fire barriers. The inspectors surveyed the control of combustible materials in safety-related areas of the plant and observed the control of ignition sources during the performance of hot work (welding).

b. Observations and Findings

Throughout the inspection period the inspectors reviewed the as-found condition of fire alarm panels, fire suppression equipment, emergency lights, and fire barriers. The inspectors noted the following:

- fire alarm panels were operable;
- automatic fire suppression equipment was aligned properly for automatic initiation;
- manual fire suppression equipment was found in its designated locations and had been inspected within the required frequency;
- emergency light batteries were found fully charged with normal voltage indicated;
- fire barriers were in place; and
- fire doors operated properly.

The inspectors noted that general house keeping was performed on a routine basis preventing the accumulation of combustible material. No accumulations of combustible materials were noted in safety-related areas of the plant.

On January 18 and 19, the inspectors observed hot work (welding) activities in the 1B essential service water pump room and in the fuel handling building respectively. The inspectors noted that the hot work permits had been obtained and the proper approvals had been received. The area in close proximity to hot work was free of combustible materials and a fire watch was provided.

c. Conclusions

The inspectors concluded that fire alarm panels, fire suppression equipment, emergency lights, and fire barriers were properly maintained and if needed should perform their functions. The inspectors concluded that combustible materials were properly controlled or eliminated from safety-related areas of the plant. Hot work (welding) was also controlled in accordance with plant procedures.

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 25, 2000. 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

- *M. Cassidy, Regulatory Assurance - NRC Coordinator
- *C. Dunn, Operations Manager
- *J. Giuffie, Mechanical Maintenance Superintendent
- *L. Guthrie, Maintenance Manager
- R. Graham, Work Control Manager
- *A. Haeger, Radiation Protection Manager
- *C. Herzog, Services Director
- *F. Lentie, Design Engineering Manager
- *T. Luke, Engineering Manager
- *J. Nalewajka, Assessment Manager
- *M. Riegel, Nuclear Oversight Manager
- *T. Simpkin, Regulatory Assurance Manager
- *B. Schramer, Chemistry Manager
- *K. Schwartz, Station Manager
- *T. Tulon, Site Vice President

NRC

- *M. Jordan, Chief, Reactor Projects Branch 3
- *C. Phillips, Senior Resident Inspector
- *J. Adams, Resident Inspector
- D. Pelton, Resident Inspector
- T. Tongue, Project Engineer

IDNS

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- * Denotes those who attended the exit interview conducted on January 25, 2000.

INSPECTION PROCEDURES USED

IP 37551: Onsite Engineering
IP 61726: Surveillance Observations
IP 62707: Maintenance Observation
IP 71707: Plant Operations
IP 71714: Cold Weather Preparations
IP 71750: Plant Support Activities

ITEMS OPENED, CLOSED, AND DISCUSSED

Opened

None

Closed

None

Discussed

None

LIST OF ACRONYMS USED

BwAP	Braidwood Administrative Procedure
BwMP	Braidwood Maintenance Procedure
BwOP	Braidwood Operating Procedure
BwOSR	Braidwood Operations Surveillance Procedure
BwRP	Braidwood Radiation Protection Procedure
BwVSR	Braidwood Engineering Surveillance Procedure
CC	Component Cooling Water
CFR	Code of Federal Regulations
EDG	Emergency Diesel Generator
EP	Emergency Preparedness
NRC	Nuclear Regulatory Commission
NRR	Nuclear Reactor Regulations
RCS	Reactor Coolant System
RP	Radiation Protection
RP&C	Radiological Protection & Chemistry
VIO	Violation