January 24, 2003

Mr. John L. Skolds, President
Exelon Nuclear
Exelon Generation Company, LLC
4300 Winfield Road
Warrenville, IL 60555

SUBJECT: BRAIDWOOD STATION, UNITS 1 AND 2
NRC INTEGRATED INSPECTION REPORT 50-456/02-09; 50-457/02-09

Dear Mr. Skolds:

On December 31, 2002, the US Nuclear Regulatory Commission (NRC) completed an integrated inspection at your Braidwood Station, Units 1 and 2. The enclosed report documents the inspection findings which were discussed on January 2, 2003, with Mr. J. von Suskil and other members of your staff.

The inspection examined activities conducted under your license as they relate to safety and to compliance with the Commission's rules and regulations and with the conditions of your license. The inspectors reviewed selected procedures and records, observed activities, and interviewed personnel.

Based on the results of this inspection, the NRC has identified one self-revealing issue that was evaluated under the risk significance determination process as having a very low safety significance (Green). The issue was determined not to involve a violation of NRC requirements.

If you contest the subject or severity of the Non-Cited Violation, you should provide a response within 30 days of the date of this inspection report, with the basis for your denial, to the U.S. Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, DC 20555-0001, with a copy to the Regional Administrator, U.S. Nuclear Regulatory Commission - Region III, Warrenville Road, Lisle, IL 60532-4351; the Director, Office of Enforcement, U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001; and the Resident Inspector at the Braidwood facility.

Since the terrorist attacks on September 11, 2001, the NRC has issued two Orders (dated February 25, 2002, and January 7, 2003) and several threat advisories to licensees of commercial nuclear power reactors to strengthen licensee capabilities, improve security force readiness, and enhance access authorization. The NRC also issued Temporary Instruction 2515/148 on August 28, 2002, that provided guidance to inspectors to audit and inspect licensee implementation of the interim compensatory measures (ICMs) required by the February 25th Order. Phase 1 of TI 2515/148 was completed at all commercial nuclear power reactors in 2002, and the remaining inspections are scheduled for completion in 2003. Additionally, table-top security drills were conducted at several licensees to evaluate the impact

of expanded adversary characteristics and the ICMs on licensee protection and mitigative strategies. Information gained and discrepancies identified during the audits and drills were reviewed and dispositioned by the Office of Nuclear Security and Incident Response. During 2003, the NRC will continue to monitor overall safeguards and security controls, conduct inspections, and resume force-on-force exercises at selected nuclear power plants. Should threat conditions change, the NRC may issue additional Orders, advisories, and temporary instructions to ensure adequate safety is being maintained at all commercial nuclear power reactors.

In accordance with 10 CFR 2.790 of the NRC's "Rules of Practice," a copy of this letter and its enclosure will be made available electronically for public inspection in the NRC Public Document Room or from the Publicly Available Records (PARS) component of NRC's document system (ADAMS). ADAMS is accessible from the NRC Web site at http://www.nrc.gov/reading-rm/adams.html (the Public Electronic Reading Room).

Sincerely,

/RA/

Ann Marie Stone, Chief
Branch 3
Division of Reactor Projects

Docket Nos. 50-456; 50-457
License Nos. NPF-72; NPF-77

Enclosure: Inspection Report 50-456/02-09; 50-457/02-09
w/Attachments: 1. Supplemental Information
2. Results of Temporary Instruction 2515/149 Inspection

See Attached Distribution

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REGION III

Docket Nos:	50-456; 50-457
License Nos:	NPF-72; NPF-77
Report Nos:	50-456/02-09; 50-457/02-09
Licensee:	Exelon Generation Company, LLC
Facility:	Braidwood Station, Units 1 and 2
Location:	35100 S. Route 53 Suite 84 Braceville, IL 60407-9617
Dates:	October 1 through December 31, 2002
Inspectors:	S. Ray, Senior Resident Inspector N. Shah, Resident Inspector S. Burgess, Senior Reactor Analyst D. Chyu, Reactor Inspector D. Funk Jr., Physical Security Inspector D. Nelson, Radiation Specialist H. Peterson, Senior Operations Engineer (Lead Inspector) T. Ploski, Emergency Preparedness Specialist S. Sanders, Reactor Operations Engineer J. Roman, Illinois Department of Nuclear Safety
Approved by:	Ann Marie Stone, Chief Branch 3 Division of Reactor Projects

Enclosure

SUMMARY OF FINDINGS

IR 05000456/2002-009, 05000457/2002-009; Exelon Generation Company, LLC; on 10/01-12/31/02, Braidwood Station; Units 1 & 2. Operability Evaluations.

This report covers a 3-month period of baseline resident inspection and an announced baseline inspection on radiation protection, emergency preparedness, and biennial/annual review of the licensed operator requalification program. In addition, generic safety issue inspections in accordance with Temporary Instruction (TI) 2515/148, "Inspection of Nuclear Reactor Safeguards Interim Compensatory Measures," Revision 1, and TI 2515/149, "Mitigating Systems Performance Index Pilot Verification," were conducted. The inspections were conducted by Region III inspectors, a Region III Senior Reactor Analyst, a Headquarters engineer, and the resident inspectors. One Green finding, which was determined not to involve a violation of NRC requirements, was identified. The significance of most findings is indicated by their color (Green, White, Yellow, Red) using Inspection Manual Chapter 0609, "Significance Determination Process" (SDP). Findings for which the SDP does not apply may be "Green" or be assigned a severity level after United States Nuclear Regulatory Commission (NRC) management review. The NRC's program for overseeing the safe operation of commercial nuclear power reactors is described in NUREG-1649, "Reactor Oversight Process," Revision 3, dated July 2000.

A. Inspection Findings

Cornerstone: Initiating Events

Green. A finding of very low safety significance was identified through a self-revealing event when the main control room received a low oil level alarm for the 2C turbine-driven feedwater pump. The alarm was caused by an oil drain valve being inadvertently left open by a non-licensed operator during planned maintenance occurring on the previous shift. The primary cause of this finding was related to the cross-cutting area of human performance, in that the plant operator did not use adequate self-checking to verify the oil drain valve was closed.

This finding was more than minor because it increased the likelihood of a reactor trip event due to low steam generator level, and could have affected the availability of the main feedwater mitigating system due to the potential loss of the 2C turbine-driven feedwater pump from low lube oil pressure. The finding was of very low safety significance because the exposure time was short, all other mitigating systems were available, and the main feedwater system could have been recovered by fairly simple operator actions. The finding was not considered a violation of regulatory requirements. (Section 1R15)

REPORT DETAILS

Summary of Plant Status

Unit 1 operated at or near full power throughout the inspection period, except that power was briefly reduced to about 94 percent on October 17, 2002, for steam generator safety relief valve testing, reduced to about 96 percent on December 4-5, 2002, for load following, and briefly reduced to about 84 percent on December 15, 2002, for turbine steam valve testing.

Unit 2 operated at or near full power throughout the inspection period, except that power was reduced to about 88 percent for a few hours on November 1, 2002, in response to a problem with feedwater heaters, and power was reduced to about 28 percent on November 2 through 3, 2002, to allow testing of feedwater isolation valves. The unit was returned to full power on November 4, 2002. Unit 2 power was also reduced by various small amounts on December 2 and twice on December 3, 2002, for load following. Finally, Unit 2 power was reduced to about 24 percent on December 26, 2002, and the generator was taken off line for generator balancing and other planned maintenance on December 27, 2002. The reactor was maintained critical during the maintenance. The generator was placed back on line on December 30 and the unit returned to full power on December 31, 2002.

1. REACTOR SAFETY

Cornerstone: Initiating Events, Mitigating Systems, and Barrier Integrity

1R01 Adverse Weather Protection (71111.01)

a. Inspection Scope

The inspectors verified that the licensee had completed its seasonal preparations for cold weather in a timely manner before the cold weather actually presented a challenge. The inspectors reviewed the licensee's completed freezing temperature annual surveillance and verified that it adequately covered risk-significant equipment and ensured that the equipment was in a condition to meet the requirements of Technical Specifications (TSs), the Technical Requirements Manual (TRM), and the Updated Final Safety Analysis Report (UFSAR) with respect to protection from low temperatures. The inspectors verified that minor issues identified during the inspection were entered into the licensee's corrective action system by reviewing the associated condition reports (CRs). Based on their importance for availability of mitigating systems, the inspectors conducted more detailed system reviews and walkdowns for the following two systems:

- during the week of October 21, 2002, the inspectors walked down the Units 1 and 2 refueling water storage tanks (RWSTs) and the associated heating systems and power supplies; and

- during the week of October 28, 2002, the inspectors walked down the Units 1 and 2 condensate storage tanks and associated heating systems and power supplies.

As part of these inspections, the inspectors reviewed the documents listed in Attachment 1.

b. Findings

No findings of significance were identified.

1R04 Equipment Alignment (71111.04)

.1 Partial Walkdown

a. Inspection Scope

On October 17 and 18, 2002, the inspectors performed a walkdown of the accessible portion of the 2A residual heat removal (RH) system train. This risk-significant mitigating system train was chosen because the redundant 2B RH train was scheduled to be taken out of service for a modification on October 20, 2002. The inspectors utilized the valve and electric breaker checklists listed in Attachment 1 to verify that the components were properly positioned and that support systems were lined up as needed. The inspectors also examined the material condition of the components and observed operating parameters of equipment to verify that there were no obvious deficiencies. The inspectors reviewed outstanding work orders (WOs) and CRs associated with the train to verify that those documents did not reveal issues that could affect train function. The inspectors used the information in the appropriate sections of the TS and UFSAR to determine the functional requirements of the system.

b. Findings

No findings of significance were identified.

.2 Complete Walkdown

a. Inspection Scope

During the week ending October 5, 2002, the inspectors conducted a system alignment inspection of the instrument air system. This system was selected because of its importance in preventing initiating events, its support of several mitigating systems, and the fact that it was a Maintenance Rule (a)(1) category system. The inspection consisted of the following activities:

- a walkdown of the system in the auxiliary building using the mechanical lineup checklist to verify proper alignment, component accessibility, availability, and current condition;
- a review of recent CRs to verify that there were no current operability concerns; and
- a review of open WOs to verify that there were no conditions impacting availability and that deficiencies had been identified.

The inspectors verified that minor issues identified during the inspection were entered into the licensee's corrective action system. Documents reviewed during this inspection are listed in Attachment 1.

b. Findings

No findings of significance were identified.

1R05 Fire Protection (71111.05)

a. Inspection Scope

The inspectors conducted fire protection walkdowns which were focused on availability, accessibility, and the condition of fire fighting equipment, the control of transient combustibles and ignition sources, and on the condition and operating status of installed fire barriers. The inspectors selected fire areas for inspection based on their overall contribution to internal fire risk, as documented in the Individual Plant Examination of External Events with later additional insights, their potential to impact equipment which could initiate a plant transient, or their impact on the plant's ability to respond to a security event. The inspectors used the documents listed in Attachment 1 to verify that fire hoses and extinguishers were in their designated locations and available for immediate use; that fire detectors and sprinklers were unobstructed; that transient material loading was within the analyzed limits; and that fire doors, dampers, and penetration seals appeared to be in satisfactory condition. The inspectors verified that minor issues identified during the inspection were entered into the licensee's corrective action program.

The following areas were inspected by walkdowns:

- Unit 1 miscellaneous electrical equipment room and safeguards battery rooms on October 15, 2002;
- Unit 2 miscellaneous electrical equipment room and safeguards battery rooms on October 15, 2002;
- Unit 1 diesel generator rooms on October 15, 2002;
- Unit 2 diesel generator rooms on October 17, 2002;
- fire protection system pumps in the lake screenhouse on October 22, 2002;
- Unit 2 emergency lights on December 2, 2002; and
- Unit 1 emergency lights on December 9, 2002.

b. Findings

No findings of significance were identified.

1R11 Licensed Operator Requalification (71111.11)

.1 Biennial Written Examination and Annual Operating Test Results

a. Inspection Scope

The inspectors reviewed the overall pass/fail results of individual written tests, Job Performance Measure operating tests, and simulator operating tests (required to be given per 10 CFR 55.59(a)(2)) administered by the licensee during calender year 2002. The overall results were compared with the significance determination process in accordance with NRC Manual Chapter 0609 Appendix I, "Operator Requalification Human Performance Significance Determination Process."

b. Findings

No findings of significance were identified.

.2 Quarterly Review of Requalification Testing and/or Training Activities

a. Inspection Scope

On October 16, 2002, the inspectors observed an operating crew during an "out-of-the-box" requalification examination on the simulator using Scenario BR-10, "Respond to a Steam Generator Tube Rupture With Miscellaneous Malfunctions," dated August 29, 2002. The inspectors evaluated crew performance in the areas of:

- clarity and formality of communications;
- ability to take timely actions in the safe direction;
- prioritization, interpretation, and verification of alarms;
- procedure use;
- control board manipulations;
- oversight and direction from supervisors; and
- group dynamics.

Crew performance in these areas was compared to licensee management expectations and guidelines as presented in the following Exelon procedures:

- OP-AA-101-111, "Rules and Responsibilities of On-Shift Personnel," Revision 0;
- OP-AA-103-102, "Watchstanding Practices," Revision 0;
- OP-AA-103-103, "Operation of Plant Equipment," Revision 0;
- OP-AA-103-104, "Reactivity Management Controls," Revision 0; and
- OP-AA-104-101, "Communications," Revision 0.

The inspectors verified that the crew completed the critical tasks listed in the above simulator guide. The inspectors also compared simulator configurations with actual control board configurations. For any weaknesses identified, the inspectors observed the licensee evaluators to verify that they also noted the issues and discussed them in the critique at the end of the session.

b. Findings

No findings of significance were identified.

1R12 Maintenance Effectiveness (71111.12)

a. Inspection Scope

During the weeks of October 28 and November 4, 2002, the inspectors reviewed the licensee's overall maintenance effectiveness for the primary containment system on both units. This system was chosen due to it being in the Maintenance Rule (a)(1) category because of previous problems. This evaluation consisted of the following specific activities:

- reviewing the maintenance rule evaluation history for the system for the previous 2 years;
- observing the conduct of surveillance testing activities for stroke timing containment isolation valves;
- reviewing selected CRs, open WOs, and control room log entries in order to identify system deficiencies; and
- a discussion with the system engineer for the system.

The inspectors also reviewed whether the licensee properly implemented the Maintenance Rule, 10 CFR 50.65, for the system. Specifically, the inspectors determined whether:

- the system was scoped in accordance with 10 CFR 50.65;
- performance problems with the system constituted maintenance rule functional failures;
- the system had been assigned the proper safety significance classification;
- the system was properly classified as (a)(1) or (a)(2); and
- the goals and corrective actions for the system were appropriate.

The above aspects were evaluated using the maintenance rule program and other documents listed in Attachment 1. The inspectors also verified that the licensee was appropriately tracking reliability and/or unavailability for the system.

b. Findings

No findings of significance were identified.

1R13 Maintenance Risk Assessments and Emergent Work Control (71111.13)

a. Inspection Scope

The inspectors reviewed the licensee's management of plant risk during emergent maintenance activities or during activities where more than one significant system or train was unavailable. The activities were chosen based on their potential impact on increasing the probability of an initiating event or impacting the operation of

safety-significant equipment. The inspections were conducted to verify that evaluation, planning, control, and performance of the work were done in a manner to reduce the risk and minimize the duration where practical, and that contingency plans were in place where appropriate.

The licensee's daily configuration risk assessments records, observations of operator turnover and plan-of-the-day meetings, and the documents listed in Attachment 1 were used by the inspectors to verify that the equipment configurations were properly listed, that protected equipment were identified and were being controlled where appropriate, and that significant aspects of plant risk were being communicated to the necessary personnel. The inspectors verified that the licensee controlled emergent work in accordance with the expectations in the procedures listed in Attachment 1.

In addition, the inspectors reviewed selected issues that the licensee entered into its corrective action program, including minor issues identified by the inspectors, to verify that identified problems were being entered into the program with the appropriate characterization and significance.

The inspectors reviewed the following activities:

- planned maintenance on the 1B steam generator power operated relief valve in conjunction with planned maintenance on the Unit 1 switchyard, electrical bus tie breaker 3-4, on October 8, 2002;
- planned maintenance on the 2B RH pump, in conjunction with planned maintenance on the Unit 2 station air compressor and 2C heater drain pump, on October 21, 2002;
- planned maintenance on the 1B essential service water pump in conjunction with planned maintenance on the 1A motor driven feedwater pump on October 24, 2002;
- troubleshooting a ground on direct current bus 212 on October 31, 2002, including direct observations of the work by plant electricians;
- planned maintenance on the 2D steam generator power operated relief valve in conjunction with drain down testing on the Unit 0 component cooling heat exchanger and planned maintenance on the 142 station auxiliary transformer on November 7, 2002, including direct observations of the drain down test; and
- planned maintenance on the 2B service water pump in conjunction with Unit 2 switchyard relay testing on November 26, 2002.

b. Findings

No findings of significance were identified.

1R14 Personnel Performance Related to Non-routine Plant Evolutions and Events (71111.14)

a. Inspection Scope

- On November 1, 2002, while the inspectors were performing a plant status walkdown in the control room, Unit 2 experienced an unexpected high-2 level alarm on the 22B, 23B and 24B low pressure feedwater heaters. This resulted in

the plant operators having to reduce power in order to isolate the affected heaters and provide for better heater level control. These actions were in accordance with Braidwood Operating Procedure BwOP HD-12, "Isolating and Returning to Service at Power Low Pressure Feedwater Heater 22A/B/C Shell Side," Revision 4. The inspectors monitored control room instrumentation to verify that plant response was as expected and observed operator response in controlling the power reduction. The transient was terminated when the operators isolated the affected heaters and reduced power from 100 percent to 86 percent. As part of this inspection, the inspectors reviewed the documents listed in Attachment 1.

- On December 26, 2002, Unit 2 power was reduced to about 24 percent and on December 27, the generator was taken off line for a preplanned maintenance outage. The reactor was maintained critical during the maintenance, with the rod control system in manual and heat removal through the steam dumps to the main condenser. Maintaining the reactor in this mode for over three days was considered a non-routine evolution. The inspectors observed planning and pre-job briefings for the evolutions and observed portions of the power reduction. In addition, the inspectors observed operators maintaining stable plant conditions with manual rod control and steam dumps and also observed portions of the evolutions of placing the generator back on line and increasing power. The inspectors verified that the operators were following the plant operating procedures listed in Attachment 1. The inspectors also observed shift turnovers to verify that the appropriate information regarding plant status and controls was being communicated. The generator was placed back on line on December 30, and the reactor returned to full power on December 31, 2002.

b. Findings

No findings of significance were identified.

1R15 Operability Evaluations (71111.15)

a. Inspection Scope

The inspectors evaluated plant conditions and selected CRs for risk-significant components and systems in which operability issues were questioned. These conditions were evaluated to determine whether the operability of components was justified. The inspectors compared the operability and design criteria in the appropriate section of the and UFSAR to the licensee's evaluations presented in the CRs and documents listed in Attachment 1 to verify that the components or systems were operable.

The inspectors reviewed the following operability evaluations:

- 2A containment spray pump cubicle cooler, and other similar coolers, on October 15, 2002, after low service water flow was noted;
- fire protection system after it failed to meet the acceptance criteria of a surveillance test on October 17, 2002;

- troubleshooting of direct current (DC) bus 211 system grounds on November 20, 2002;
- non safety-related prefilter found installed in 0B main controlled room ventilation system on November 25, 2002;
- low oil reservoir level on the 2C main feedwater pump on November 29, 2002; and
- temporary leakage repair of the Unit 1 pressurizer steam space sample line on December 11, 2002.

b. Findings

Introduction: A finding of very low safety significance (Green) was identified through a self-revealing event when the main control room received a low oil level alarm for the 2C turbine-driven feedwater pump. The alarm was caused by an oil drain valve being inadvertently left open by a non-licensed operator during planned maintenance occurring on the previous shift. The finding was not considered a violation of regulatory requirements. The finding increased the probability of a reactor transient while also potentially degrading the main feedwater mitigating system.

Description: On November 29, 2002, the Unit 2 control room received an unexpected annunciator, "Feedwater Pump Turbine Bearing Oil Level Low," for the 2C turbine-driven feedwater pump. Subsequently, operators in the field observed that there was no oil in the 2C pump lube oil reservoir sightglass. The operators immediately added oil, verified that the feedwater pump was operable, and initiated a prompt investigation. The investigation identified that the low oil condition was caused by an oil drain valve being inadvertently left open by a non-licensed operator, while performing BwOP TO-10, "Turbine Feed Pump Oil Purification System Operation," Revision 8, on the previous shift. The resulting loss of lube oil to the main feedwater pump could have resulted in a pump trip possibly leading to a low steam generator level reactor trip due to the loss of feedwater flow. During the event, the inspectors observed the as-found condition of the oil drain valve, that the motor driven feedwater pump was available, and that the control room staff was preparing for a potential pump trip, by reviewing Braidwood Abnormal Operating Procedure 2BwOA SEC-1, "Secondary Pump Trip–Unit 2," Revision 100.

Analysis: The inspectors determined that the operator's action in leaving the oil drain valve open was a performance deficiency warranting a significance evaluation in accordance with Inspection Procedure Manual (IMC) 0612, "Power Reactor Inspection Reports," Appendix B, "Issue Disposition Screening," issued on April 29, 2002. This finding was considered more than minor, because it increased the likelihood of an initiating event (i.e., reactor trip due to low steam generator level) and could have affected the availability of the main feedwater mitigating system (i.e., 2C feedwater pump trip). The inspectors determined that this event also affected the cross-cutting area of Human Performance, because the operator did not perform adequate self-checking to ensure that the oil drain valve was closed.

The inspectors completed a significance determination of this issue, using IMC 0609, "Significance Determination Process," dated April 30, 2002, Appendix A, "Significance Determination of Reactor Inspection Findings for At-Power Situations," dated March 18, 2002.

For the Phase 1 screening, the inspectors answered "No" to all the questions under the Initiating Event column. This was based on the short exposure time, the availability of all other mitigating systems, and the availability of the motor-driven feedwater pump, which could have been started by fairly simple operator actions. Therefore, this finding (FIN 50-457/02-09-01) is considered of very low safety significance (Green). The finding was assigned to the Initiating Event Cornerstone for Unit 2.

Enforcement: The inspectors concluded that no violation of regulatory requirements had occurred. The operator was performing activities in accordance with a procedure for a nonsafety-related system. This procedure was not one required by 10 CFR 50, Appendix B. The licensee entered the event into its corrective action system as CR 133502, "2C Feedwater Pump Low Oil Reservoir Level," on November 29, 2002.

1R16 Operator Workarounds (71111.16)

a. Inspection Scope

- On December 9, 2002, the inspectors reviewed several abnormal operating procedures used by the operators for response to certain events. The inspectors looked for steps in the procedures that could be classified as operator workarounds because they directed operators to perform actions or operate equipment in a manner that was not consistent with the current design basis of the plant and that could affect the operators' ability to implement the procedures. Procedures reviewed for this inspection are listed in Attachment 1.

- On December 19, 2002, the inspectors reviewed Operator Workaround 225, "1CB025 Air Regulators Out of Adjustment or Gages Bad May Prevent Valve From Opening on a High 2 Actuation." The inspectors verified that the workaround did not substantially hinder the operators' ability to implement abnormal or emergency procedures, that the operators were aware of and trained on the workaround, and that actions had been initiated to return the system to normal operation. Documents reviewed as part of this inspection are listed in Attachment 1.

b. Findings

No findings of significance were identified.

1R19 Post Maintenance Testing (71111.19)

a. Inspection Scope

The inspectors reviewed the post maintenance testing activities associated with maintenance or modification of important mitigating, barrier integrity, and support systems to ensure that the testing adequately verified system operability and functional capability with consideration of the actual maintenance performed. The inspectors used the appropriate sections of the TS and UFSAR, as well as the documents listed in Attachment 1, to evaluate the scope of the maintenance and to verify that the post maintenance testing was performed adequately, demonstrated that the maintenance

was successful, and that operability was restored. The inspectors verified that minor issues identified during the inspection were entered into the licensees corrective action system.

Testing subsequent to the following activities was observed and evaluated:

- modification of the control board switch for valve 2RH611 on October 21, 2001;
- repair of the head gasket on 1A diesel generator air compressor 1 on October 23, 2002;
- modification of 1A diesel generator air dryer 1 on October 23 and 24, 2002;
- modification of the control board switch for valve 1 RH611 on October 28, 2002;
- testing of the Unit 1 RWST heating pump on November 15, 2002; and
- planned maintenance on the 1A RH pump on December 11, 2002.

b. Findings

No findings of significance were identified.

1R22 Surveillance Testing (71111.22)

a. Inspection Scope

The inspectors witnessed selected surveillance testing and/or reviewed test data to verify that the equipment tested using the surveillance procedures met the TS, the TRM, the UFSAR, and licensee procedural requirements, and demonstrated that the equipment was capable of performing its intended safety functions. The activities were selected based on their importance in verifying mitigating systems capability and barrier integrity. The inspectors used the documents listed in Attachment 1 to verify that the testing met the frequency requirements; that the tests were conducted in accordance with the procedures, including establishing the proper plant conditions and prerequisites; that the test acceptance criteria were met; and that the results of the tests were properly reviewed and recorded.

The following tests were observed and evaluated:

- calibration of Unit 1 Channel A, delta temperature and average coolant temperature loops on October 16, 2002;
- Unit 1 steam generator safety relief valve TREVI testing on October 17, 2002;
- monthly testing of the 2B diesel-driven auxiliary feedwater pump on October 21, 2002;
- monthly testing of the 2B diesel generator on November 27, 2002; and
- quarterly testing of the 2A motor-driven auxiliary feedwater pump on December 6, 2002.

b. Findings

No findings of significance were identified.

1R23 Temporary Modifications (71111.23)

a. Inspection Scope

- On October 8, 2002, the inspectors reviewed a temporary maintenance alteration to install a freeze seal isolation on the component cooling water supply to the Unit 2 fuel pool heat exchanger. This activity was chosen because a significant problem with the freeze installation could have potentially resulted in a loss of Unit 2 component cooling water which would have resulted in a reactor shutdown due to the loss of cooling water flow to the Unit 2 reactor coolant pumps. This was an installation in support of maintenance and was intended to be in place for less than 90 days, so a formal safety evaluation was not required.

  The inspectors reviewed the WO for the job, including the engineering review for the installation, the engineering change to the original review to allow the work to be accomplished during plant operations, and the plant barrier impairment permits. The inspectors also walked down the piping where the freeze was to be installed before the work began, attended the high level awareness briefing, and observed a portion of the work. In addition, the inspectors also reviewed the operations contingency plan for potential failure of the freeze and attended shift turnover meetings where the contingencies were discussed. Finally the inspectors verified that the operations temporary change tracking log was used to record the temporary change as required.

  The inspectors verified that problems identified by the licensee during the freeze installation were entered into the corrective action system. As part of this inspection, the inspectors reviewed the documents listed in Attachment 1.

- On October 11, 2002, the inspectors performed a walkdown of the Units 1 and 2 auxiliary building to observe whether there were any installed, unauthorized temporary modifications.

b. Findings

No findings of significance were identified.

Cornerstone: Emergency Preparedness

1EP4 Emergency Action Level and Emergency Plan Changes (71114.04)

a. Inspection Scope

The inspectors reviewed Revisions 8, 9, and 10 of the Braidwood Station Annex to Exelon's Standardized Emergency Plan to determine whether changes identified reduced the effectiveness of the licensee's emergency planning, pending onsite inspection of the implementation of these changes.

b. Findings

No findings of significance were identified.

2. RADIATION SAFETY

Cornerstone: Occupational Radiation Safety

2OS1 Access Control to Radiologically Significant Areas (71121.01)

Plant Walkdowns, Radiological Boundary Verification, Radiation Work Permit Reviews and Observations of Radiation Worker Performance

a. Inspection Scope

During the week of October 21, 2002, the inspectors conducted walkdowns of selected radiologically controlled areas within the plant to verify the adequacy of radiological boundaries and postings. Specifically, the inspectors walked down several radiologically significant work area boundaries (high and locked high radiation areas) in the Units 1 and 2 auxiliary building, the radwaste building, and the spent fuel pool and performed confirmatory radiation measurements to verify that these areas and selected radiation areas were properly posted and controlled in accordance with 10 CFR Part 20, licensee procedures, and the TRMs. The inspectors also reviewed the radiological conditions within those work areas walked down, to assess the radiological housekeeping and contamination controls.

b. Findings

No findings of significance were identified.

2OS2 As-Low-As-Is-Reasonably-Achievable (ALARA) Planning and Controls (71121.02)

.1 Radiological Work/ALARA Planning

a. Inspection Scope

During the week of October 26, 2002, the inspectors examined the station's procedures for radiological work/ALARA planning and scheduling, and evaluated the dose projection methodologies and practices implemented for the 2002 Unit 2 refueling outage (A2R09), to verify that sound technical bases for outage dose estimates existed.

The inspectors reviewed the exposure results and ALARA post-job reviews for selected A2R09 activities to evaluate the accuracy of exposure estimates in the ALARA plans. The inspectors compared the actual exposure results versus the initial exposure estimates, the estimated and actual dose rates as well as the estimated and actual man-hours expended. The inspectors reviewed the exposure history for each activity and reviewed management involvement in exposure tracking to assess outage dose performance and dose control practices. The inspectors reviewed selected work-in-

progress ALARA reviews and ALARA post-job reviews to determine if additional engineering/dose controls for those activities had been established, and if required corrective documents had been generated. Those work activities included Unit 2 valve work, steam generator project work, reactor head disassembly, installation and removal of insulation, and the assembling and disassembling of scaffolding.

b. Findings

No findings of significance were identified.

.2 Verification of Exposure Estimate Goals and Exposure Tracking System

a. Inspection Scope

During the week of October 26, 2002, the inspectors reviewed the methodology and assumptions used by the licensee for its A2R09 exposure estimates and exposure goals. Actual job exposure data was compared with estimates to verify that the licensee could project and, thus, control radiological exposure. The inspectors also reviewed the licensee's exposure tracking system to verify that the level of exposure tracking detail, exposure report timeliness, and exposure report distribution were sufficient to support control of collective exposures. The inspectors evaluated how the licensee had identified problems with its exposure estimates for some jobs, the processes being utilized to revise dose estimates, and methods to improve its dose forecasting procedures to verify that the licensee could adequately track dose.

b. Findings

No findings of significance were identified.

.3 Identification and Resolution of Problems

a. Inspection Scope

During the week of October 26, 2002, the inspectors reviewed 2002 focus area self-assessments of ALARA Planning and Controls, and High Radiation Area Controls/Posting to evaluate the effectiveness of the self-assessment process to identify, characterize, and prioritize problems. The inspectors also reviewed corrective action documentation to verify that previous access control and ALARA related issues were adequately addressed. The inspectors also selectively reviewed January - October 2002, CRs that addressed access control and ALARA program deficiencies to verify that the licensee had effectively implemented the corrective action program.

b. Findings

No findings of significance were identified.

3. SAFEGUARDS

Cornerstone: Physical Protection

3PP1 Response to Contingency Events (71130.03)

a. Inspection Scope

On October 15, 2002, the inspectors reviewed the status of security operations and assessed licensee implementation of the protective measures in place as a result of the current, elevated threat environment.

b. Findings

No findings of significance were identified.

4. OTHER ACTIVITIES

40A1 Performance Indicator Verification (71151)

Cornerstones: Mitigating Systems and Occupational Radiation Safety

.1 Mitigating Systems Performance Indicator Verification

a. Inspection Scope

The inspectors reviewed documents listed in Attachment 1 to verify that the licensee had corrected reported performance indicators data, in accordance with the criteria in Nuclear Energy Institute 99-02, "Regulatory Assessment Performance Indicator Guideline," Revision 2. The following performance indicators were reviewed for the period of October 1, 2001, through September 30, 2002:

- safety system unavailability, high pressure safety injection system on November 18, 2002; and
- safety system unavailability, auxiliary feedwater system on December 4, 2002.

b. Findings

No findings of significance were identified.

.2 Occupational Radiation Safety Performance Indicator Verification

a. Inspection Scope

During the week of October 26, 2002, the inspectors verified the licensee's assessment of its performance indicator for occupational radiation safety. Since no reportable elements were identified by the licensee for the 4th quarter of 2001 and the first three

quarters of 2002, the inspectors selectively reviewed the licensee's data elements to verify that there were no occurrences in the occupational radiation safety cornerstone during those quarters.

b. Findings

No findings of significance were identified.

40A2 Identification and Resolution of Problems (71152)

.1 Routine Review of Identification and Resolution of Problems

a. Inspection Scope

As discussed in previous sections of this report, the inspectors routinely reviewed issues during baseline inspection activities and plant status reviews to verify that they were being entered into the licensee's corrective action system at an appropriate threshold, that adequate attention was being given to timely corrective actions, and that adverse trends were identified and addressed. Minor issues entered into the licensee's corrective action system as a result of inspectors' observations are generally denoted in the report or in the documents in Attachment 1.

b. Findings

No finding of significance were identified.

.2 Selected Issue Follow-up

Maintenance Effectiveness of Diesel Generator Work

Introduction

During the 1st two weeks of October 2002, the inspectors reviewed licensee CR 120314, "Potential Trend–Maintenance Effectiveness of Diesel Generator Work," dated August 22, 2002. This CR was written to evaluate a potential adverse trend involving planned maintenance on the 2A and B emergency diesel generators occurring between July and August 2002. Individually these events affected the mitigating systems cornerstone, as they potentially affected the availability of the emergency diesel generators.

The licensee's evaluation identified two specific common failure modes: inadequate work practices (including human performance) and poor process work management (including work planning and job preparation). The inspectors reviewed this evaluation, including the individual CRs documenting the specific maintenance problems, to determine the adequacy of the licensee's problem identification, prioritization and evaluation of issues, and corrective actions.

a. Effectiveness of Problem Identification

(1) Inspection Scope

The inspectors reviewed CR 120314 and 24 additional CRs generated between July and August 2002, documenting the adverse trend and the specific events comprising the trend. The inspection focused on the licensee's threshold for documenting the maintenance problems, the types of events identified, and the circumstances leading to the discovery of the conditions. The inspectors had previously observed portions of the 2A and B diesel generator maintenance activities as documented in Sections 1R12, 1R13 and 1R19 of Inspection Report 50-456/457-02-07. The inspectors also reviewed licensee post job critiques for prior planned work on the 1A and B emergency diesel generators occurring in December 2001 and February 2002, respectively.

(2) Issues

The inspectors concluded that the licensee had effectively identified the maintenance issues associated with the 2A and B emergency diesel generator work. Specifically, the inspectors observed that the licensee had identified the maintenance problems at a low threshold and had correctly entered them into the corrective action program. These problems were either self-revealing or identified through routine maintenance, equipment checks and/or were self-reported events. The majority of the problems were identified and addressed during the respective work windows. During the 1A and B diesel generator work, the licensee had made similar, but fewer observations, regarding the maintenance work. However, the majority of these previous events dealt primarily with minor work planning and scheduling concerns.

b. Prioritization and Evaluation of Issues

(1) Inspection Scope

The inspectors reviewed the licensee's common cause evaluation for those maintenance events documented in CR 120314. Specifically, the inspectors evaluated how the licensee had arrived at the overall conclusions and assessed whether these conclusions were appropriate. The inspectors also reviewed the results of several, recent maintenance self-assessments regarding work conduct and planning. For the common cause evaluation, the inspector referred to licensee procedure LS-AA-125-1002, "Common Cause Analysis Manual," Revision 2.

(2) Issues

The licensee identified two common failure modes for these events: inadequate work practices (including human performance); and poor process work management (i.e., work planning and job preparation). These causes were similar to the root causes identified for the individual events and the inspectors

noted that the licensee's evaluation was performed consistent with the station procedure. Additionally, these conclusions were similar to the findings of the maintenance self-assessments. However, the inspectors noted that the licensee did not interview those workers involved in the 2A and B diesel generator work and did not review related maintenance department self-assessments as part of the common cause evaluation. Although neither action was required by the procedure, the inspectors were concerned that by not performing them other, potentially significant insights may not be identified. The licensee acknowledged the inspectors' concerns and was reviewing them for a potential, future revision of the procedure.

c. Effectiveness of Corrective Actions

(1) Inspection Scope

The inspectors reviewed the licensee's corrective actions for the individual 2A and B diesel generator maintenance events and for the common cause evaluation results.

(2) Issues

The inspectors concluded the licensee's corrective actions for the individual diesel generator maintenance events were effective. As stated in Section 40A2.2(a), these events were primarily identified and addressed during the respective work windows. However, the inspectors noted that the licensee's common cause evaluation did not assess whether the corrective actions for the individual maintenance events were effective. This action was not specifically required by station procedure LS-AA-125-1002. For the events in general, the licensee planned to perform further evaluations of maintenance work practices and work management to identify what additional concerns and associated actions were needed. Although these corrective actions were adequate, the inspectors questioned their effectiveness given that prior maintenance self-assessments of these areas had already been performed. As stated in Section 40A2.2(b), these self-assessments were not reviewed as part of the common cause evaluation. These observations were also provided to the licensee as stated in Section 40A2.2(b).

4OA3 Event Follow-up (71153)

.1 (Closed) Licensee Event Report (LER) 50-456/457-2002-003-00: Isolated Loop Reactor Coolant System Boron Sample Outside of Technical Specification Frequency Requirement Due to Misapplication of the Implementing Procedure.

During refueling outages, isolated loop boron concentration was determined from samples of the water used to fill the reactor coolant loop. Technical Specification 3.4.18.2 required that the boron concentration in the isolated coolant loop be verified to be greater than or equal to the required shutdown margin boron concentration of the unisolated portion of the loop within 4 hours prior to unisolating the loop. However, on

September 11, 2002, the licensee identified that these samples were often collected and analyzed greater than 4 hours before the loop isolation valves were opened. The root cause of the TS non-compliance was the failure to clearly reflect the sampling and analysis requirements in station procedure BwOP RC-8, "Restoring a Reactor Coolant System Loop to Service," Revision 3. Because the isolated reactor coolant loops were normally filled with borated water at a concentration higher than the shutdown margin, the failure to meet the TS was minor. Additionally, the inspectors determined that the probability of accidental dilution of the isolated loop boron concentration from leakage past the loop isolation valves, was small. Corrective actions included a planned revision to BwOP RC-8 to clearly reflect the TS requirements and a proposed TS amendment to clarify the sampling requirements. The failure to meet the sampling requirements of TS 3.4.18.2 constitutes a violation of minor significance that is not subject to enforcement action in accordance with Section IV of the NRC's Enforcement Policy. The LER was reviewed by the inspectors and no findings of significance were identified. This issue was entered into the licensee's corrective action system as CR 122579, "Late TS Sample for Surveillance 3.4.18.2," dated September 11, 2002.

.2 Response to Security Events

a. Inspection Scope

The inspectors briefly reviewed the licensee's response to security events during the inspection period. This was accomplished by discussions with security management personnel, observations of changes made to the security measures after each event, and reviewing the documents in Attachment 1. Response to the following events were reviewed:

- a trespassing incident in the owner controlled area on December 10, 2002; and
- a trespassing incident in the owner controlled area on December 17, 2002.

b. Findings

No findings of significance were identified.

4OA4 Cross-Cutting Findings

A finding described in Section 1R15 of this report had, as a primary cause, a human performance deficiency in that a plant operator did not perform adequate self-checking to ensure that the 2C turbine-driven feedwater pump oil drain valve was closed following planned maintenance.

4OA5 Other Activities

.1 (Closed) Unresolved Item (URI) 50-456/00-06-02; 50-457/00-06-02: Licensing requirements reduced for two auxiliary building fire zones.

During the 2000 triennial fire protection inspection, the inspectors determined that the licensee changed Fire Zones 11.5-0 and 11.6-0 (auxiliary building, 401' and 426' elevations, respectively), from fire zones which complied with the guidelines of Branch Technical Position (BTP) Chemical Mechanical Engineering Branch (CMEB) 9.5-1, Section C.5.b.(2).(a), which required separating redundant safe shutdown trains with a 3-hour fire barrier, to areas for which alternative shutdown capability should be provided in accordance with BTP CMEB 9.5-1, Section C.5.b.(3), without providing fixed suppression systems in the fire zones. In addition, during a follow-up inspection to the above issue in October 2001, the inspectors questioned a change in administrative procedures which reduced or eliminated fire watch requirements in areas where suppression systems were inoperable.

During the thermo-lag resolution period, the licensee re-routed redundant power cables out of Fire Zones 11.5-0 and 11.6-0. During this process, the licensee identified that power and control cables for the main control room ventilation system were also present in these fire zones and was unable to reroute these cables. The redundant cables for the control room ventilation system were needed for safe shutdown and were not protected by a 3-hour rated fire barrier. Assuming a loss of control room ventilation, the temperatures in the control room would increase beyond panel qualifications within 2-3 hours. The operators would have to evacuate the control room and take instrument readings at the fire hazards panel. Therefore, the licensee designated the fire zones as areas that utilized alternative shutdown capability.

The purpose of this inspector review was to determine whether there was any adverse effect on safe shutdown capabilities based upon designating these fire zones as requiring alternative shutdown capabilities. The inspectors reviewed Braidwood's licensing basis as discussed in Amendments 3 and 7 to the Fire Protection Report, the Byron Safety Evaluation Report and subsequent supplements (NUREG 876), and the Braidwood Safety Evaluation Report and subsequent supplements (NUREG 1002) to determine the applicability of the requirement for an area-wide suppression system in Fire Zones 11.5-0 and 11.6-0. If the control cables from both redundant trains of equipment were located in the same fire zone, credit would be taken for alternate shutdown via local operation of equipment as specified in various plant procedures (Section 2.4.1.5 of Amendment 3). In addition, deviations for the fire zones not having suppression systems, because the areas were not completely separated from other fire areas, were approved by the NRC.

Based on the level of fire protection features originally approved by the NRC, the inspectors determined that the operators would likely use the control room only as a point of command. Safe shutdown actions would be initiated outside of the control room for a fire in these two areas (demonstrated during Byron Station, Units 1 & 2, triennial fire protection inspection in December 2001). Therefore, this designation change did not adversely affect the methods of achieving and maintaining safe shutdown and was consistent with the licensee's licensing basis and the approved fire protection program. The licensee subsequently changed the area designation back to areas requiring safe shutdown capabilities (meeting requirements of III.G.2) and proceduralized operator actions to be taken in the event of loss of the control room ventilation system.

Therefore, the inspectors determined that the classification change for the two fire zones did not adversely affect the licensee's ability to achieve and maintain safe shutdown conditions in the event of a fire. This aspect of the item is closed.

With respect to compensatory measures, the licensee still required continuous fire watches for an inoperable suppression system in areas where redundant systems or components could be damaged, such as in the case of Fire Zone 11.3-0. For all other fire zones, the sprinkler systems were not used to protect redundant safe shutdown functions but to mitigate smoke and heat propagation from one fire area to another. Furthermore, the purpose of a continuous fire watch was two-fold: to notify the control room; and, to initiate actions to extinguish small fires utilizing available equipment. The function of notifying the control room was replaced by the operable detection systems in the area. For a small fire, after the receipt of the alarm in the control room, an operator would be dispatched immediately to investigate the fire location before dispatching the full team of fire brigade members. For a more severe fire beyond the capability of the fire watch, the expected fire growth would be limited since the purpose of the water suppression system was to control (not to extinguish) the fire until the arrival of fire brigade members. Therefore, this change in fire watch requirements was acceptable.

.2 (Closed) URI 50-456/00-06-01; 50-457/00-06-01: Equipment Important for Safe Shutdown Not Identified.

Examples identified by the inspectors included the centrifugal charging pump discharge valve, pressurizer auxiliary spray valve, component cooling water thermal barrier cooling isolation valves, and the main steam isolation valves. Since the identified issues concerned the potential effects of fire damage on associated circuits related to safe shutdown components and the resultant spurious actuation of such components, this item will be tracked as a part of URI 50-456/00-06-03; 50-457/00-06-03, "Effects of Associated Circuits Not Isolated from Safe Shutdown Equipment."

.3 Pre-Inspection of Appendix A to Temporary Instruction (TI) 2515/148, Inspection of Nuclear Reactor Safeguards Interim Compensatory Measures, Revision 1

The inspectors completed the pre-inspection audit for interim compensatory measures at nuclear power plants, dated September 13, 2002.

.4 Completion of TI 2515/149, Mitigating System Performance Index (MSPI) Pilot Verification

On November 12, through December 17, 2002, the inspectors completed the requirements of the TI to verify that the licensee had correctly implemented the MSPI pilot guidance for reporting unavailability and unreliability of the monitored safety systems. The inspectors verified that minor issues identified during the inspection were entered into the licensee's corrective action system. Documents reviewed during this inspection are listed in Attachment 1. The detailed results of this inspection are documented in a memorandum included as Attachment 2.

4OA6 Meetings

.1 Exit Meeting

The inspectors presented the inspection results to Mr. J. von Suskil and other members of licensee management at the conclusion of the inspection on January 2, 2003. The inspectors asked the licensee whether any materials examined during the inspection should be considered proprietary. No proprietary information was identified.

.2 Interim Exit Meetings

The results of the radiation protection inspection were presented to T. Joyce at the conclusion of the inspection on October 24, 2002. The inspectors did not receive any information identified as proprietary during this inspection

The results of the safeguards inspection were presented to J. von Suskil at the conclusion of the inspection on October 29, 2002. The inspectors did not receive any information identified as proprietary during this inspection.

The results of the biennial/annual licensed operator requalification review were presented to with D. Burton, Licensed Operator Requalification Training Group Lead on November 4, 2002, via telephone and to D. Myers, Training Director on December 19, 2002, via telephone.

SUPPLEMENTAL INFORMATION

KEY POINTS OF CONTACT

Licensee
J. von Suskil, Site Vice President
T. Joyce, Plant Manager
J. Bailey, Regulatory Assurance - NRC Coordinator
G. Baker, Site Security Manager
R. Blaine, Radiation Protection Manager
D. Burton, Licensed Operator Requalification Training Group Lead
D. Chrzanowski, Inservice Inspection Coordinator
G. Dudek, Operations Manager
C. Dunn, Site Engineering Director
A. Ferko, Regulatory Assurance Manager
T. Green, Nondestructive Examination Level III Inspector
P. Hippley, Initial License Operator Training Group Lead
D. Myers, Dresden Training Director
G. O'Donnell, Engineer
M. Sears, Engineering Programs

United States Nuclear Regulatory Commission
M. Chawla, Project Manager, Office of Nuclear Reactor Regulation
A. Stone, Chief, Reactor Projects Branch 3

LIST OF ITEMS CLOSED

Opened

50-457/02-09-01	FIN	Feedwater oil drain valve inadvertently left open

Closed

50-456/00-06-01; 50-457/00-06-01	URI	equipment important for safe shutdown not identified
50-456/00-06-02; 50-457/00-06-02	URI	license requirements reduced for two auxiliary building fire zones
50-456/457/02-03-00	LER	Isolated Loop Reactor Coolant System Boron Sample Outside of TS Frequency Requirement Due to Misapplication of the Implementing Procedure
50-457/02-09-01	FIN	Feedwater oil drain valve inadvertently left open

LIST OF DOCUMENTS REVIEWED

1R01 Adverse Weather Protection

Braidwood Administrative Procedure BwAP 335-1T1; Shift Manager Turnover - Thursday October 24, 2002 Oncoming Shift 2; Revision 6E1

BwAP 335-1T2;Unit 1 Supervisor Turnover - Thursday October 24, 2002, Oncoming Shift 2; Revision 9E1

BwAR 1-6-A5; RWST Temp LO-2; Revision 6E4

BwOP CD-E2; Electrical Lineup; Revision 1E2

BwOP SI-E1; Electrical Lineup - Unit 1 Operating; Revision 6

BwOP SI-E2; Electrical Lineup - Unit 2 Operating; Revision 4

BwOP SI-10; RWST Heating Pump and Heater Operations; Revision 10

BwOP SI-M1; Operating Mechanical Lineup Unit 1; Revision 14

Braidwood Operating Surveillance Requirement Procedure 1BwOSR 0.1-1,2,3; Unit 1 Modes 1, 2, and 3 Shiftly and Daily Operating Surveillance; Revision 19

CR128742; Repeat Maintenance - Chronic Problem with 1SI03P Control Circuitry; October 24, 2002 [NRC-Identified]

CR 128743; Evidence of Boric Acid Leakage on RWST Heating System; October 24, 2002 [NRC-Identified]

CR 129159; Two Different Heaters Have the Same Equipment Part Number (0VV17A); October 28, 2002

CR129771; Potential Winter Readiness Enhancements Identified; October 31, 2002

CR129811; NRC Issues/Comments Related to Winter Readiness; October 30, 2002 [NRC-Identified]

CR 132142; Repeat Maintenance - 1SI03P Tripped on Thermal Overload, November 16, 2002

OP-AA-108-109; Seasonal Readiness; Revision 0

WO 407928 01; Unit 0 Freezing Temperature Equipment Protection Annual Surveillance (40 degrees F); September 17, 2002

WO 470917; Replace Hand Switch and Starter (Contactor) for 1SI03P; October 18, 2002

WO 496102 01; Unit 0 Cold Weather Annual Surveillance; October 13, 2002

WO 496102 01; Unit 0 Station Heat Area Heaters Annual Surveillance; October 13, 2002

Inspection Response Sheet; Issue Number 065-00; June 7, 2000

Memo From F. Schuster to Walrath; Winter Readiness Assessment; October 30, 2002

Refueling Water Storage Tank Temperature Evaluation; November 5, 2002

Technical Specification Surveillance Requirement 3.5.4.1; Amendment 98

UFSAR Table 3.8-4; Revision 3

Nuclear Fuel Management Transmittal of Design Information NFM9900188; Best Estimate Large Break LOCA [Loss of Coolant Accident] Input Assumptions for Byron/Braidwood at Power Uprate Conditions - Units 1&2; Sequence 3

1R04 Equipment Alignment

BwOP RH-E2; Electrical Lineup - Unit 2 Residual Heat Removal System Operating Electrical; Revision 2

BwOP RH-M3; Operating Mechanical Lineup Unit 2 2A Train; Revision 6

BwOP RH-2; Securing the Residual Heat Removal System From Recirculation; Revision 7E5

BwOP RH-11; Securing the Residual Heat Removal System From Shutdown Cooling; Revision 17

BwOP IA-M3; Operating Mechanical Lineup Unit 0 Auxiliary Building Operating; Revision 9

CR 091925; Unit 2 Instrument Air Exceeded the Maintenance Rule Unavailability Goals; January 23, 2002

CR 095028; NRC Questions With Respect To Corrective Actions Assigned In Response To Action Request 56396; February 13, 2002

CR 106491; Isolation Valve and Attached Pipe for Instrument Air Separated From Header; May 2, 2002

CR 117408; Unusual Moisture Blowdown From The Unit 2 Instrument Air Receiver; July 29, 2002

CR 119337; Loss of Instrument Air Pressure on Both Units - Cause Unknown; August 14, 2002

CR 126301; NRC Notes on Valve Lineup Missing Label and Incorrect Location; October 7, 2002 [NRC-Identified]

WO 00062072; Operations to Install New Valve Label

WO 00484563; Instrument Air 4-inch Header Isolation Valve Leaking at Bolted Connection

Drawing M-55; Diagram of Instrument Air Auxiliary Building Braidwood Station Unit 1 &2; Sheets 5 through 9; Revision G

Drawing M-137; Diagram of Residual Heat Removal Unit 2; Revision BE

1R05 Fire Protection

0BwOA; Control Room Inaccessibility Unit 0; Revision 101

1BwOA; Control Room Inaccessibility Unit 1; Revision 100

2BwOA; Control Room Inaccessibility Unit 2; Revision 100

CR 130044; Emergency Light 2LL2-78 Not Properly Fed From Power Supply; November 2, 2002

CR 130237; Parts Replacement Required in Group 3 Emergency Lights; November 4, 2002

CR 131026; Group 4 Emergency Lighting Surveillance Finds Deficiencies; November 11, 2002

CR 131918; Group 12 Emergency Light Surveillance Finds Deficiencies; November 13, 2002

Fire Protection Report Section 2.3 (selected subsections); Fire Area Analysis; Amendment 18

Fire Protection Report Section 2.4; Safe Shutdown Analysis for Braidwood-1 and 2; Amendment 18

Fire Protection Report Section 3.2 (selected subsections); Fire Hazards Analysis; Amendment 19

Table; Summary of Braidwood Fire Induced Core Damage Frequency Results; Based on Calculation BRW-97-0502-N

Exelon Procedure CC-AA-211; Fire Protection Plan; Revision 0

1R12 Maintenance Effectiveness

1BwOSR 3.6.3.5.RE-1; Reactor Coolant Drain Tank Containment Isolation Valve Stroke Quarterly Surveillance; Revision 1

2BwOSR 3.6.3.5.RF-1; Reactor Building Floor Drain Containment Isolation Valve Stroke Quarterly Surveillance; Revision 2

1BwOSR 3.6.3.5.WO-1; Containment Chilled Water Containment Isolation Valve Stroke Quarterly Surveillance; Revision 2

2BwOSR 3.6.3.5.FW-5; Feedwater Tempering Isolation 2AOV-FW035 Valves Full Stroke Tests Quarterly Surveillance; Revision 0

2BwOSR 3.6.5.5 SA-1; Service Air System Containment Isolation Valve Stroke Quarterly Surveillance; Revision 1

CR 093969; Valve Stroke Time Outside Alert Limits on Original Strokes; February 5, 2002

CR 121564; Containment Isolation Valve 1FC011 Appendix J Local Leakage Rate Indeterminate; September 4, 2002

Computerized Control Room Logs; January 1, 2001, through October 29, 2002; Search Criteria: “3.6"

Technical Specification Basis Table B 3.6.3-1; Penetration Number 47; Revision 13

Maintenance Rule - Evaluation History; Primary Containment System; January 1, 2001, through October 29, 2002

Maintenance Rule - Expert Panel Scoping Determination; Primary Containment System

Maintenance Rule - (a)(1) Action Plan; Primary Containment System

Maintenance Rule - Performance Criteria; Primary Containment System

1R13 Maintenance Risk Assessments And Emergent Work Control

Braidwood Instrument Surveillance Procedure BwISR 3.3.2.10-218; Operational Test/Surveillance Calibration of Auxiliary Feedwater Pump Suction Loop _P-AF052; Revision 2

BwOP SY-19; Relay Tests for the L2004 345KV Line to Davis Creek TSS86; Revision 0E2

2BwOSR 3.7.7.2; U-2, U-0, Component Cooling Heat Exchanger Essential Service Water Availability Monthly Surveillance; Revision 2

CR 130518; Ground on UAT 241-2 Sudden Pressure Relay; November 6, 2002

WO 98070649; Contingency Work Order to Identify 125 VDC Bus 212 Ground

WO 99007211; 2MS018D Repair Valve Leakby

WO 99225613; Unit 2 Station Air Compressor Intercooler Coating Cure

WO 00420604; Replace Station Air Compressor Discharge Air Valve

WO 00450768; Revise Control Switch (2RH611) For Residual Heat Removal Pump 2B Miniflow Valve

WO 00462980; Perform Maintenance on 6 Kilovolt Switchgear Breaker

WO 00479644; Unit 2 Essential Service Water Oil Analysis

WO 00480913; Unit 1 Station Auxiliary Transformer Bus 4 Bus Connections At Switchyard

WO 00500753; Perform Unit 0 Component Cooling Heat Exchanger Drain Down

Complex Troubleshooting Data Sheet for WO 98070649

212 Ground Tracing Follow Up Plan; November 7, 2002

1R14 Personnel Performance During Non-Routine Plant Evolutions

BwOP HD-12; Isolating and Returning to Service at Power OP FW Heater _2A/B/C Shell Side; Revision 4

CR 129848; Unplanned Entry Into TRM 3.3G Due to 2ES011B Not Stroking; November 1, 2002

Active Operator Log Shift 1 - 2; November 1, 2002

Reactivity Maneuver Form; Ramp for 2FW009A&B Repair; October 31, 2002

Unit 2 Electronic Operations Logs; November 1, 2002

2BwGP 100-3; Power Ascension 5% to 100%; Revision 23

2BwGP 100-4; Power Descension; Revision 17

2BwGP 100-5; Plant shutdown and Cooldown; Revision 26

Reactivity Maneuver Form; Description of Reactivity Maneuver - A2M03; Revision 0

A2M03 Schedule; December 28, 2002

Nuclear Oversight Memorandum NOL 20-02-0434; AwM03 Outage Concerns; December 20, 2002

Troubleshooting Plan; Unit 2 Main Generator Turbine Vibration Troubleshooting

1R15 Operability Evaluations

BwAR 2-16-D3; FW Pump Turbine Bearing Oil Level High Low; Revision 6

2BwOA SEC-1; Secondary Pump Trip Unit 2; Revision 100

BwOP TO-10; Turbine Feed Pump Oil Purification System Operation; Revision 8

0BwOS FP-SA9; Fire Protection System Leakage Semiannual Surveillance; Revision 0

Braidwood Engineering Procedure BwVP 700-2; Fire Protection System Leakage Trace; Revision 0

CR 122791; Positive 125 Volt Ground on Direct Current Bus 211; September 13, 2002

CR 126439; 2A CS Cubicle Cooler Failed Performance Test - Unplanned LCO; October 8, 2002

CR 127284; SX Flow Through 1A CS Room Cooler on 1FI-SX093 Read 0; October 14, 2002

CR 127753; 0BwOS FP-SA9 Failed Acceptance Criteria; October 17, 2002

CR 130449; 1B CV Pump Cubicle Cooler Flow Found Low at 5 GPM; November 6, 2002

CR 130883; 2B RH Pump Degraded Seal Cooler Flow, Inadvertent LCO Entry; November 9, 2002

CR 131019; 2B CS Pump Cubicle Cooler Low SX Flow; November 10, 2002

CR 132808; Incorrect VA Filters Reserved for 0VA04FF; November 22, 2002

CR 133360; No EPN Valve Found Open During 1B AF Pump Monthly Surveillance; November 27, 2002

CR 133502; 2C FW Pump Low Oil Reservoir Level; November 29, 2002

WO 369393; Attachment 1 Temporary Leak Sealant Injection Permit; October 26, 2001 and Revisions dated November 19, 2001 and December 10, 2002

Safety-Related Component Parts Classification Report; Byron/Braidwood Units 1 and 2 Air Filter Units MX-F030-001; Revision 01; December 29, 1988

Sargent & Lundy Project Instruction PI-BB-86; Requirements for the Procurement and Dedication For Use of Parts For Safety-Related Components; Revision 01

Sargent & Lundy Parts Classification For Failure Modes and Effect Analysis - Definitions and Coded Terminology; Revision 01

Sargent & Lundy Memorandum From L. A. Carson -30-22723 To S. N. Planjery; Review of Farr Company Seismic Report L-65327, Revision C for Filter Units 0VC01SA, SB; August 4, 1982

Sargent & Lundy Memorandum From L.A. Carson - 30; Seismic Qualification and Support Loads For Pre Filters 0VA03FA-FI; 0VA07FA, FB; 0VA11FA-FI; Project Number 4683,4-00; October 3, 1983

Supporting Operability Documentation (for CR 126439); dated October 14, 2002

Computer Generated Graph; 2VA03SA - 2A Containment Spray Pump Cubicle Cooler Performance Tests; March 25, 1991 through October 9, 2002

Talking Points for 2A Containment Spray Pump Cubicle Cooler; dated October 15, 2002

1R16 Operator Workarounds

0BwOA ENV-6; Operation During Chlorine/Toxic Chemical Incident Unit 0; Revision 1

0BwOA PRI-5; Control Room Inaccessibility Unit 0; Revision 101

0BOA PRI-8; Auxiliary Building Flooding Unit 0; Revision 2

0BwOA SECURITY-1; Security Threat; Revision 0

1BwOA PRI-5; Control Room Inaccessibility Unit 1; Revision 100

2BwOA PRI-5; Control Room Inaccessibility Unit 2; Revision 100

BwOP VC-16; Operation of the Control Room HVAC [Heating Ventilation and Air Conditioning] System in the Reticulation Mode; Revision 1

Exelon Nuclear Procedure OP-AA-102-103; Operator Work-Around Program; Revision 0

CR 106637; 1CB025; December 10, 2002

WR 00048260; Need to Adjust Set Pressures on Air Regulators; May 3, 2002

WR 00446501; 1AOV-CB025 - Need to Adjust Set Pressures on Air Regulators; September 24, 2002

1R19 Post Maintenance Testing

1BwOSR 5.5.8.RH-3B; Residual Heat Removal System Train B Valve Stroke Quarterly Surveillance; Revision 1

2BwOSR 3.8.1.2-2; Unit 2 2B Diesel Generator Operability Monthly and Semiannual Surveillance; Revision 6

2BwOSR 5.5.8.RH-3B; Residual Heat Removal System Train B Valve Stroke Quarterly Surveillance; Revision 1

CR 128228; Unexpected Delay - MOD Installation of 2RH611 Control Switch; October 21, 2002

CR 128620; Suspect Preconditioning of 2RH611 During Valve Stroke Surveillance; October 23, 2002 [NRC-Identified]

CR 134960; 1A RH Pump Inappropriately Logged As Available; December 10, 2002

EC 0000337451; Revise Control Switch (1RH611) to Maintain Open Contact

EC 0000337454; Revise Control Switch (2RH611) to Maintain Open Contact; September 27, 2002

EC 0000339717 001; Replace Existing 5A Breaker with a 10A Breaker for Breaker 134V5 D3; November 15, 2002

WO 00450758; Revise Control Switch for 1RH611 Per EC#337451

WO 00450768; Revise Control Switch for 2RH611 Per EC#337454; Revision 0

WO 00486267; ASME Surveillance Requirements for RH Pump 1RH01PA; December 10, 2002

WO 00493180; 1DG01SA-A Upper Head Gasket Failed

Modification Test D20-1-98-301-001-1; 1A Diesel Generator Starting Air Dryer 1DG01SA-C Testing; Revision 0

Memo to J. Steele From G. Nelson; Engineering Change (EC) 0000337454, issued "For Construction." Revise Control Switch (2RH611) to Maintained Open Contact; September 30, 2002

1R22 Surveillance Testing

BwISR 3.3.1.10-M201; Operational Test and Channel Verification/Calibration for Loops _T-0411 and _T-0412; Revision 5

Braidwood Maintenance Procedure BwMP 3305-107; Main Steam Safety Valves Lift Point Verification Using the Furmanite Trevi-Test System; Revision 8

BwOP AF-5; Motor Driven Auxiliary Feedwater Pump _A Startup on Recirc; Revision 17

BwOP AF-6; Motor Driven Auxiliary Feedwater Pump _A Shutdown; Revision 13

2BwOSR 3.7.5.3-1; Unit Two Motor Driven Auxiliary Feedwater Pump Quarterly Surveillance; Revision 0E1

2BwOSR 3.7.5.3-2; Unit Two Diesel Driven Auxiliary Feedwater Pump Monthly Surveillance; Revision 1

Braidwood Engineering Surveillance Requirement Procedure 2BwVSR 5.5.8.AF.1; Unit Two Motor Driven Auxiliary Feedwater Pump ASME Quarterly Surveillance; Revision 4

CR 128875; Enhancements from Post Job Critique on Trevi-Testing; October 25, 2002

CR 134427; Trending Degradation of 2SX101A; December 6, 2002

WO 00340302; 1T-0411/412 Reactor Coolant Loop 1A Delta Temperature, 18 Month Calibration

WO 00367873 08; Main Steam Safety Valves Operability Test; October 17, 2002

1R23 Temporary Plant Modifications

2BwOA PRI-6; Component Cooling Malfunction Unit 2; Revision 102

CC-AA-403; Maintenance Specification: Selection and Control of Freeze Seal Location; Revision 1

CR 126473; Unable to Establish Freeze of Line 2CC60A-16; October 8, 2002

CR 127379; Enhancement CR to Capture Lessons Learned from 2CC9502B; October 15, 2002

MA-AA-MM-6-00610; Application of Freeze Seal to All Piping; Revision 0

WO 99233296 06; Valve Disc Appears Separated from Stem - Repair Valve; September 13, 2002

WO 00504922 01; 2B Diesel Generator Operability Monthly; November 27, 2002

WR 990233296 02; Spent Fuel Pit HX 2CC Outlet 2CC Outlet Install/Remove Freeze to Support Task - 01; December 20, 2000

1EP4 Emergency Action Level and Emergency Plan Changes

Braidwood Station Annex to Exelon's Standardized Emergency Plan; Revisions 8, 9, and 10

2OS1 Access Control to Radiologically Significant Areas

RWP 10000871; NRC Surveillance and Tours; Revision 2

RP-AA-376; Radiological Posting, Labeling, and Markings; Revision 0

RP-AA-460; Controls for High Radiation Area and Very High Radiation Areas; Revision 2

CR 103333; Survey Doesn't Reflect Current Dose Rates; April 8, 2002

CR 104735; Radiologically Controlled Area Work (Snubber and Inservice Inspections) Done Under Wrong RWP; April 20, 2002

CR 106376; Violation of Radiological Posting - Operations Personnel; May 1, 2002

CR 107361; Poor Rad Worker Practices in the Cavity; May 3, 2002

CR 110995; Nuclear Oversight Identified Radiation Protection Outside Posting Deficiency; June 6, 2002

CR 117907; Seal Table Controls During Outage; August 8, 2002

2OS2 ALARA Planning and Control

RP-AA-400; ALARA Program; Revision 2

RP-AA-401; Operational ALARA Planning and Controls; Revision 2

RP-AA-403; Administration of the Radiation Work Permit Program; Revision 1

RP-AA-4002; Radiation Protection Refuel Outage Readiness; Revision 0

A2R09; Refueling Outage Spring 2002, ALARA Summary Report

RWP 10000874; A2R09 Venture Valve Activities, Work-in-Progress Review; April 30, 2002

RWP 10000874; A2R09 Venture Valve Activities, Work-in-Progress Review, Post-Job Review; May, 2002

RWP 10000883; Reactor Cavity Decon Activities; Revision 2

RWP 10001078; A2R09 Shielding, Installation and Removal, Work-in Progress Review; April 22, 2002

Focus Area Self-Assessment of High Radiation Area Controls/Postings for Braidwood; September 23 - October 2, 2002

Focus Area Self-Assessment of the ALARA Planning and Controls ; September 16 - September 19, 2002

4OA1 Performance Indicator Verification

Performance Indicator Data for Safety System Unavailability - High Pressure Safety Injection and Auxiliary Feedwater; from NRC Website www.nrc.gov/NRR/OVERSIGHT/ASSESS//

Braidwood Electronic Archival Operations Narrative Logs (with various keyword searches); October 1, 2001, through September 30, 2002

LS-AA-2140; Monthly Performance Indicator (PI) Data Elements for Occupational Exposure Control Effectiveness; 12 Months September 2001 - September 2002; Revision 3

4OA2 Identification and Resolution of Problems

CR 096414; Rework Power Jacket Water/Essential Service Water Cooler Leak During System Refill-1B Diesel Generator; February 22, 2002

CR 097914; Rework - Failed Post Maintenance Testing 1B Diesel Generator Jacket Water Make Up; March 5, 2002

CR 106922; 2A Diesel Generator Work Window Was Rescheduled, Parts & Work Package Issues; May 2, 2002

CR 107413; Lack of Materials Management Participation in 2A Diesel Generator Planning; May 9, 2002

CR 107418; Work Planning Did Not Attend 2A Diesel Generator Planning Meeting; May 8, 2002

CR 114795; Nuclear Oversight Identifies Deficient Fundamentals WC-AA-10 - 2A Diesel Generator Work Window; July 9, 2002

CR 115034; 2A Diesel Generator, Cylinder 5L Piston Skirt Tin Coating Was Missing; July 9, 2002

CR 115088; Failed to Check “Free to Rotate” on the 2A Diesel Generator; July 10, 2002

CR 115137; Foreign Material Found Floating in 2A Diesel Generator Oil Sump; July 11, 2002

CR 115314; Rework - Two Leaks Discovered During 2A Diesel Generator Post Maintenance Testing; July 11, 2002

CR 115931; Rework - Diesel Generator Starting Air System Regulator Failure (2DG5230A); July 13, 2002

CR 117729; 2B Diesel Generator Air Compressor #2 Air Leak; July 21, 2002

CR 119277; 2DG01KA 6 Year Inspection Work Window Execution Issues; July 15, 2002

CR 119319; Rework - 2A Diesel Generator Turbo Thrust Bearing Trip - Unplanned Limiting Condition for Operation; August 14, 2002

CR 119491; 2A Diesel Generator Overspeed Trip During Testing; August 15, 2002

CR 119721; Potential Rework - 2A Diesel Generator Trip During Cooldown Cycle Testing; August 16, 2002

CR 119885; Damaged Parts Identified in the 2B 5R Diesel Generator Head Assembly; August 19, 2002

CR 120193; Oil Leak at the 2B Diesel Generator 8L Rocker Arm Inspection Dover; August 22, 2002

CR 120196; Rework - Air Leak at 2DG5230B 2B Diesel Generator 80# Regulator; August 21, 2002

CR 120314; Potential Trend - Maintenance Effectiveness of Diesel Generator Work; August 22, 2002

CR 126519; Common Cause Analysis Identified Two Failure Modes for Diesel Generator Maintenance Effectiveness; October 9, 2002

CR 132693; Diesel Generator Common Cause Analysis and Corrective Actions Didn’t Focus on Change Management; November 21, 2002

CR 136308; Equipment Status Tag Left on 2B Emergency Diesel Generator Valve 2DG5221B After Work Complete; December 17, 2002 (NRC Identified)

Action Tracking Item 113316-03; Potential Adverse Trend Observed in Station Rework; January 2000 through July 2002

LS-AA-125-1002; Common Cause Analysis Manual; Revision 2

Maintenance Focus Area Self-Assessment; Rework Program Effectiveness; March 26 through March 30, 2001

Maintenance Focus Area Self-Assessment; Detailed Analysis and Review of the Rework Program Database; April 16 through June 26, 2001

Maintenance Focus Area Self-Assessment; Corrective Actions Taken on Rework Items in the Instrument Maintenance Department Have Been Effective; June 1, 2000 to June 1, 2001

Focus Area Self-Assessment; Review the Current Braidwood Station Work Request Backlog; May 13 through May 20, 2002

Focus Area Self-Assessment; Procedure and Work Instructions Use and Adherence in Maintenance; July 1 through September 7, 2001

4OA3 Event Followup

CR 122579; Late Technical Specification Sample for Surveillance 3.4.18.2; September 11, 2002

LER 50-456/45702-03-00; Isolated Loop Reactor Coolant System Boron Sample Outside of TS Frequency Requirement Due To Misapplication of the Implementing Procedure; November 12, 2002

CR 135205; Vehicle Did Not Stop at Security Checkpoint; December 9, 2002

CR 135673; NRC Operations Center Notification of a Security Incident; December 12, 2002

CR 136514; Trespasser Incident Onto Braidwood Owner Controlled Area; December 17, 2002

4OA5 Other Activities

CR 132819; MSPI Pilot Inspection Results - Components Not Modeled in PRA; November 22, 2002 [NRC-identified]

CR 132821; MSPI Pilot Inspection Results - Documentation (Bases/Support0; November 22, 2002 [NRC-identified]

CR 132825; MSPI Pilot Inspection Results - Performance Data; November 22, 2002; [NRC-identified]

Mitigating Systems Performance Index Basis Document

TI 2515/149; Mitigating Systems Performance Index Pilot Verification; September 24, 2002

Nuclear Energy Institute (NEI) Draft NEI 99-02 MSPI, Appendix F; Methodologies For Computing the Unavailability Index, the Unreliability Index and Determining Performance Index Validity; Revision 0

Draft NEI 99-02 MSP, Attachment A; Mitigating System Performance Index; Revision 0

Excel Spreadsheets for MSPI data submittal; Baseline Data, 2nd Quarter 2002, and 3rd Quarter 2002

Braidwood Units 1 and 2 Performance Indicator Data for Safety System Unavailability; From NRC website www.nrc.gov/NRR/OVERSIGHT/ASSESS/

Braidwood Electronic Archival Operations Narrative Logs (with various keyword searches); April 1, 2002, through September 30, 2002

LIST OF ACRONYMS USED

ADAMS	Agencywide Documents Access and Management System
ALARA	As-Low-As-Is-Reasonably-Achievable
BTP	Branch Technical Program
BwAP	Braidwood Administrative Procedure
BwIS	Braidwood Instrument Surveillance
BwMP	Braidwood Maintenance Procedure
BwOA	Braidwood Abnormal Operating Procedure
BwOP	Braidwood Operating Procedure
BwOS	Braidwood Operating Surveillance
BwOSR	Braidwood Operating Surveillance Requirement
BwVP	Braidwood Engineering Procedure
BwVSR	Braidwood Engineering Surveillance Requirement
CMEB	Chemical Mechanical Engineering Branch
CFR	Code of Federal Regulations
CR	Condition Report
DC	Direct Current
DRS	Division of Reactor Safety
IMC	Inspection Manual Chapter
LER	Licensee Event Report
MSPI	Mitigating System Performance Index
NCV	Non-Cited Violation
NRC	Nuclear Regulatory Commission
PARS	Publicly Available Records
RH	Residual Heat Removal
RWST	Refueling Water Storage Tanks
TI	Temporary Instruction
SDP	Significance Determination Process
TRM	Technical Requirements Manual
TS	Technical Specification
UFSAR	Updated Final Safety Analysis Report
URI	Unresolved Item
WO	Work Order

RESULTS OF THE TEMPORARY INSTRUCTION (TI) 2515/149 INSPECTION

The inspectors completed the requirements of TI 2515/149, "Mitigating Systems Performance Index (MSPI) Pilot Verification," at Braidwood on December 17, 2002. The inspectors determined that the licensee made a reasonable best effort to provide accurate and complete data for this voluntary pilot program. Most data errors were small and some problems occurred because the guidance for the MSPI program was still under development.

The following discrepancies/issues were noted: (Paragraph numbers correspond to the inspection requirements sections of TI 2515/149.)

03.02 Risk-Significant Functions

No discrepancies were noted. Functions were consistent with the Significance Determination Process (SDP) and (Standardized Plant Analysis Risk) SPAR model assumptions.

03.03 Success Criteria

The licensee generally used the design basis for success criteria, but did not identify which criteria were exceptions to the design and what they were based on.

03.04 Unreliability Boundary Definition

Several active components were not modeled in the licensee's Probabilistic Risk Analysis (PRA) and therefore had a Fussell-Vesely (F-V) of zero assigned in the MSPI spreadsheet. Thus, any unavailability or unreliability of the components were not included in the MSPI calculation. Examples included:

- Centrifugal charging (CV) pump mini-flow isolations valves, CV8114/8116. The licensee's PRA model assumed that operators will provide a backup should the valves fail to close. As a result, the valves were not modeled nor were the operator action of redundant valves.
- Safety injection (SI) system to hot legs (A, B, C, D) isolation valves, SI8802A/B.
- SI accumulator (A, B, C, D) discharge isolation valves, SI8808A/B/C/D. The model did not consider the impact of inadvertent nitrogen addition if the valves do not close following a large break loss of coolant accident.
- SI pump cold leg isolation valves, SI 8835.
- Auxiliary feedwater (AF) pump essential service water (SX) recirculation valves, AF024. The model assumed that the valves is not a flow diversion path and not modeled.
- Residual heat removal (RHR) pump A/B mini-flow valves, RH610/RH611. The model had an incorrect normal valve position. As a result, the valves were not modeled.
- RHR to cold leg A/D isolation valves, SI8809A/B.
- RHR to hot leg A/C isolation valves, SI8840. The model assumed that the hot leg injection/recirculation is not required.
- SX from the component cooling water (CC) heat exchanger valve SX007 was only modeled as a spurious closure. It did not model the required operator action or failure of the valves to open when the CC system is used to provide heat removal.

- The PRA model assumed that condensate storage tank refill will occur (but it is not modeled). As a result, the SX supply to AF would only challenged following a rupture of the CST. This could underestimate the F-V for the SX pumps and AF valves.

03.05 Train/Segment Unavailability Boundary Definition

The licensee did not specify electrical boundaries. MSPI guidance stated that the last breaker or relay for electrical power and controls should be in the boundaries for pumps and valves.

03.06 Entry of Baseline Data - Planned Unavailability

The licensee used data previously submitted for the performance indicator program. However, the licensee was unable to access the original computerized spreadsheets from which the data was developed. Thus, the inspectors were unable to verify that the data was correct. Samples of this data was previously verified to be correct during performance indicator verification inspections using Inspection Procedure 71151.

03.07 Entry of Baseline Data - Unplanned Unavailability

No discrepancies were noted. Correct table values were used.

03.08 Entry of Base line Data - Unreliability

No discrepancies were noted. Correct table values were used.

03.09 Entry of Performance Data - Unavailability

The inspectors sampled data reported for the 2nd quarter 2002 for AF and the 3rd quarter 2002 for CC and SX for the current performance index.

- The inspectors identified an inconsistency with whether the licensee counted the diesel-driven AF pump as being unavailable during weekly confidence runs using the normal operating procedure that were done in addition to the normal surveillance tests. During the inspection, licensee engineers determined that the pump starts should not be counted as unavailable and intended to revise the appropriate background documents.

- The inspectors identified that the licensee was inconsistent in handling unavailable times of less than 15 minutes. Also the licensee was inconsistent in whether to count as unavailable time the period when the SX pumps were in pull-to-lock for oil samples. That evolution was not listed as an exempt activity for unavailability.

03.10 Entry of Performance Data - Unreliability

The inspectors sampled data from the 2nd quarter 2002 for AF, CC and SX and the 3rd quarter 2002 for CC and SX for the current performance index.

- The inspectors identified that the run hours the licensee reported for SX pumps for the 2nd and 3rd quarter of 2002 had been significantly overstated (by approximately 300 hours

per pump per quarter). During the inspection, licensee engineers found the source of the problem and stated that the data would be corrected in the December 2002 data submittal.

- The inspectors identified that the licensee under reported the number of start demands on the 2A AF pump for the 2nd quarter 2002. The licensee reported 14 starts when there were actually 15. During the inspection, licensee engineers confirmed the errors and stated that the data would be corrected in the December 2002 data submittal.

- The inspectors identified small errors in the run time of both the 2A and 2B AF pumps for the 2nd quarter of 2002. During the inspection, licensee engineers confirmed that a run period of about 1.5 hours had been assigned to the 2B pump when actually the 2A pump was running. The engineers stated that the data would be corrected in the December 2002 data submittal.

- The inspectors identified that the licensee under reported the number of stroke demands for AF valves 2AF006A and B and 2AF017A and B for the 2nd quarter of 2002. The licensee estimated one stroke for each valve based on quarterly surveillance schedules but missed that the once-per-18 month surveillance was completed during that quarter which added an additional stoke for each valve. The licensee engineers stated that the data would be corrected in the December 2002 data submittal.

- The licensee generally did not screen pump start demands to eliminate those for post maintenance tests. The MSPI guidance documents state that generally those starts should not be counted as demands.

03.11 MSPI Calculation

The licensee had not identified all of the F-V coefficients due to certain components being not modeled in their PRA (as noted in section 03.04) or the F-V coefficient was truncated out at a 1E-10 value. Specific components with no F-V value due to truncation include:

- CV pump 1B (assumed to be in standby in model)
- AF pump SX suction valves, AF006A/B
- AF pump SX suction valves, AF017A/B
- SX pump 2A/2B (opposite unit) 1B/2B assumed running in PRA model
- '0' CC pump
- CC pump 2A/2B (opposite unit)
- Opposite unit SX from CC heat exchanger outlet valves, SX007