UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION III
2443 WARRENVILLE ROAD, SUITE 210
LISLE, IL 60532-4352

May 14, 2010

Mr. Charles G. Pardee
Senior Vice President, Exelon Generation Company, LLC
President and Chief Nuclear Officer (CNO), Exelon Nuclear
4300 Winfield Road
Warrenville, IL 60555

SUBJECT: BRAIDWOOD STATION, UNITS 1 AND 2 NRC INTEGRATED INSPECTION REPORT 05000456/2010002; 05000457/2010002

Dear Mr. Pardee:

On March 31, 2010, the U.S. Nuclear Regulatory Commission (NRC) completed an inspection at your Braidwood Station, Units 1 and 2. The enclosed inspection report documents the inspection results, which were discussed on April 6, 2010, with Mr. A. Shahkarami and other members of your staff.

The inspection examined activities conducted under your license as they relate to safety and 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, two NRC-identified findings, one NRC-identified SL-IV violation, and one self-revealed finding of very low safety significance were identified. The findings involved violations of NRC requirements. However, because of their very low safety significance, and because the issues were entered into your corrective action program, the NRC is treating the issues as Non-Cited Violations in accordance with Section VI.A.1 of the NRC Enforcement Policy. Additionally, a licensee-identified violation is listed in Section 4OA7 of this report.

If you contest the subject or severity of a Non-Cited Violation, you should provide a response within 30 days of the date of this inspection report, with the basis for your disagreement, 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, 2443 Warrenville Road, Suite 210, Lisle, IL 60532-4352; the Director, Office of Enforcement, U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001; and the Resident Inspector Office at Braidwood Station. In addition, if you disagree with the characterization of the cross-cutting aspect of any finding in this report, you should provide a response within 30 days of the date of this inspection report, with the basis for your disagreement, to the Regional Administrator, Region III, and the NRC Resident Inspector at Braidwood Station. The information that you provide will be considered in accordance with Inspection Manual Chapter 0305.

In accordance with 10 CFR 2.390 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), accessible from the NRC Web site at http://www.nrc.gov/reading-rm/adams.html (the Public Electronic Reading Room).

Sincerely,

/RA/

Richard A. Skokowski, Chief
Branch 3
Division of Reactor Projects

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

Enclosure: Inspection Report 05000456/2010002; 05000457/2010002
w/Attachment: Supplemental Information

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U. S. NUCLEAR REGULATORY COMMISSION

REGION III

Docket Nos:	50-456; 50-457
License Nos:	NPF-72; NPF-77
Report No:	05000456/2010002 and 05000457/2010002
Licensee:	Exelon Generation Company, LLC
Facility:	Braidwood Station, Units 1 and 2
Location:	Braceville, IL
Dates:	January 1 through March 31, 2010
Inspectors:	B. Dickson, Senior Resident Inspector A. Garmoe, Acting Senior Resident Inspector N. Shah, Acting Senior Resident Inspector C. Scott, Acting Resident Inspector J. Robbins, Byron Resident Inspector R. Langstaff, Senior Reactor Inspector M. Perry, Resident Inspector Illinois Emergency Management Agency
Approved by:	R. Skokowski, Chief Branch 3 Division of Reactor Projects

Enclosure

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SUMMARY OF FINDINGS

IR 05000456/2010002, 05000457/2010002; 01/01/2010 - 03/31/2010; Braidwood Station, Units 1 & 2; Operability Evaluations; Plant Modifications; Event Follow-Up; and Other Activities.

This report covers a 3-month period of inspection by resident inspectors and announced baseline inspections by regional inspectors. Two Green findings were identified by the inspectors, one Severity Level IV violation was identified by the inspectors, and one Green finding was self-revealed. The findings were considered Non-Cited Violations of NRC regulations. The significance of most findings is indicated by their color (Green, White, Yellow, Red) using Inspection Manual Chapter (IMC) 0609, “Significance Determination Process” (SDP). Cross-cutting aspects were determined using IMC 0305, “Operating Reactor Assessment Program.” Findings for which the SDP does not apply may be Green or be assigned a severity level after 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 4, dated December 2006.

A. NRC-Identified and Self-Revealed Findings

Cornerstone: Mitigating Systems

- Green: The NRC identified a finding of very low safety significance (Green) and an associated Non-Cited Violation of 10 CFR 50, Appendix B, Criterion XVI, “Corrective Action,” for the licensee’s failure to correct a Condition Adverse to Quality associated with the Unit 2A component cooling water heat exchanger. The licensee’s corrective actions included initiating a new work request to repair the degradation during the next refueling outage, and determining how the work requests could be closed despite being properly tied to the corrective action program.

  This performance deficiency was considered more than minor because it was similar to example 3(g) in Appendix E of Inspection Manual Chapter 0612, in that a Condition Adverse to Quality was not corrected and it recurred, such that the operability of a mitigating system component was potentially affected. Because there was no actual loss of operability or functionality of the 2A component cooling water heat exchanger, the issue screened out as having very low safety significance (Green). This finding is associated with the cross-cutting area component of corrective action program in the problem identification and resolution cross-cutting area. Specifically, the licensee did not thoroughly evaluate why work requests to correct degradation of the 2A component cooling water heat exchanger were repeatedly cancelled with no actions taken and for unknown reasons (P.1(c)). (Section 1R15.2)

- Severity Level IV: The inspectors identified a finding of very low safety significance and an associated Severity Level IV Non-Cited Violation for the failure to perform an adequate 10 CFR 50.59 screening of a temporary modification. Specifically, the licensee failed to recognize the impact of a temporary modification on emergency operating procedures, which resulted in the failure to perform a full evaluation of the modification. The licensee’s corrective actions included reinforcing the current configuration of the 2B reactor vessel level indication system with operators and revising emergency operating procedures. In addition, the licensee plans to complete a full 10 CFR 50.59 evaluation to determine whether the modification required NRC approval prior to implementation.

The inspectors concluded that the violation was more than minor because the inspectors could not reasonably conclude that the modification would not require prior NRC approval based on the 10 CFR 50.59 screening. The inspectors answered 'no' to the Mitigating Systems cornerstone questions in Table 4 and, as a result, the issue screened as one of very low safety significance (Green). This finding is associated with the cross-cutting area component of decision-making in the human performance cross-cutting area. Specifically, when evaluating the operations impact of a new temporary modification on the 2B RVLIS probe, the licensee assumed the impact was unchanged from a prior temporary modification on the same equipment, which resulted in necessary procedure changes that were not identified (H.1(b)). (Section 1R18.2)

- Green. A finding of very low safety-significance and an associated Non-Cited Violation of Unit 2 License Condition 2.E was identified by the inspectors for the licensee's failure to provide foam sprinklers in the 2B diesel oil storage tank room that were free of obstructions. Specifically, the licensee failed to install all of the foam sprinklers in accordance with National Fire Protection Agency's NFPA-16-1980, "Standard for the Installation of Deluge Foam-Water Sprinkler Systems and Foam-Water Spray Systems," and NFPA-13-1985, "Standard for the Installation of Sprinkler Systems." The licensee entered the issue into their corrective action program for resolution and planned to evaluate the system and determine what modifications were required.

  The finding was determined to be more than minor because the deficiencies affected the Mitigating Systems Cornerstone objective of ensuring the capability of systems to respond to initiating events such as fire. Specifically, the discharge of the foam spray may not reach a fire and could prevent the extinguishing agent from suppressing and extinguishing a diesel fuel oil spill fire because of the proximity of obstructions to the sprinklers. Because a fire involving a diesel oil storage tank room would only affect the associated emergency diesel generator and no other equipment would be affected, the issue was of very low safety-significance. No cross-cutting aspects were associated with this finding because it was not representative of current performance. (Section 4OA5)

Cornerstone: Barrier Integrity

- Green: A finding of very low safety significance and an associated Non-Cited Violation of 10 CFR 50, Appendix B, Criterion V, "Procedures," was self-revealed when, on January 9, 2010, auxiliary building ventilation fan 0VA01CC caught fire, resulting in the declaration of an Unusual Event. Specifically, troubleshooting performed on the inboard fan bearing in Spring 2009 changed the bearing oil level without proper limits established, which led to bearing failure due to lack of lubrication. The licensee's corrective actions included an evaluation of the oil consumption trends for other auxiliary building ventilation fans, additional training on work package quality, and a revision to other existing work orders that are intended to adjust auxiliary building ventilation fan oil levels.

  The finding was more than minor because it impacted the Systems, Structures, and Components and Barrier Performance attribute of the Barrier Integrity cornerstone objective to provide reasonable assurance that physical design barriers (fuel cladding, reactor coolant system, and containment) protect the public from radionuclide releases caused by accidents or events. Because the finding only represented degradation, rather than loss, of the radiological barrier function provided for the auxiliary building it screened as an issue of very low safety significance (Green). This finding is associated with the cross-cutting area component of resources in the human performance cross-cutting area. Specifically, the work instructions for troubleshooting did not contain adequate guidance to adjust the oil bubbler without causing an adverse equipment impact (H.2(c)). (Section 4OA3.4)

B. **Licensee-Identified Violations**

A violation of very low safety significance that was identified by the licensee has been reviewed by inspectors. Corrective actions planned or taken by the licensee have been entered into the licensee's corrective action program. This violation and corrective action tracking number are listed in Section 4OA7 of this report.

REPORT DETAILS

Summary of Plant Status

Unit 1 operated at or near full power for the duration of the inspection period.

Unit 2 operated at or near full power for the duration of the inspection period.

1. REACTOR SAFETY

Cornerstones: Initiating Events, Mitigating Systems, and Barrier Integrity

1R04 Equipment Alignment (71111.04)

.1 Quarterly Partial System Walkdowns

a. Inspection Scope

The inspectors performed partial system walkdowns of the following risk-significant systems:

- 1A safety injection (SI) train during 1B SI pump work window;
- 2B containment spray (CS) during 2A CS work window; and
- 1A residual heat removal (RH) during 1B RH work window.

The inspectors selected these systems based on their risk significance relative to the Reactor Safety Cornerstones at the time they were inspected. The inspectors attempted to identify any discrepancies that could impact the function of the system, and, therefore, potentially increase risk. The inspectors reviewed applicable operating procedures, system diagrams, Updated Final Safety Analysis Report (UFSAR), Technical Specification (TS) requirements, outstanding work orders (WOs), condition reports, and the impact of ongoing work activities on redundant trains of equipment in order to identify conditions that could have rendered the systems incapable of performing their intended functions. The inspectors also walked down accessible portions of the systems to verify system components and support equipment were aligned correctly and operable. The inspectors examined the material condition of the components and observed operating parameters of equipment to verify that there were no obvious deficiencies. The inspectors also verified that the licensee had properly identified and resolved equipment alignment problems that could cause initiating events or impact the capability of mitigating systems or barriers and entered them into the corrective action program (CAP) with the appropriate significance characterization. Documents reviewed are listed in the Attachment.

These activities constituted three partial system walkdown samples as defined in Inspection Procedure (IP) 71111.04-05.

b. Findings

No findings of significance were identified.

1R05 Fire Protection (71111.05)

.1 Routine Resident Inspector Tours (71111.05Q)

a. Inspection Scope

The inspectors conducted fire protection walkdowns which were focused on availability, accessibility, and the condition of firefighting equipment in the following risk-significant plant areas:

- Unit 1 and Unit 2 essential service water (SX) pump rooms;
- Unit 1 and Unit 2 main feedwater (FW) pumps;
- 2B CS pump room;
- 1B auxiliary feedwater (AF) pump room; and
- main control room (MCR).

The inspectors reviewed areas to assess if the licensee had implemented a fire protection program that adequately controlled combustibles and ignition sources within the plant, effectively maintained fire detection and suppression capability, maintained passive fire protection features in good material condition, and implemented adequate compensatory measures for out-of-service, degraded or inoperable fire protection equipment, systems, or features in accordance with the licensee's fire plan. The inspectors selected fire areas based on their overall contribution to internal fire risk as documented in the plant's Individual Plant Examination of External Events with later additional insights, their potential to impact equipment which could initiate or mitigate a plant transient, or their impact on the plant's ability to respond to a security event. Using the documents listed in the Attachment, the inspectors verified 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 fire doors, dampers, and penetration seals appeared to be in satisfactory condition. The inspectors also verified that minor issues identified during the inspection were entered into the licensee's CAP. Documents reviewed are listed in the Attachment.

These activities constituted five quarterly fire protection inspection samples as defined in IP 71111.05-05.

b. Findings

No findings of significance were identified.

1R06 Flooding (71111.06)

.1 Internal Flooding

a. Inspection Scope

The inspectors reviewed selected risk important plant design features and licensee procedures intended to protect the plant and its safety-related equipment from internal flooding events. The inspectors reviewed flood analyses and design documents, including the UFSAR, engineering calculations, and abnormal operating procedures to identify licensee commitments. The specific documents reviewed are listed in the Attachment. In addition, the inspectors reviewed licensee drawings to identify areas and equipment that may be affected by internal flooding caused by the failure or misalignment of nearby sources of water, such as the fire suppression or the circulating water systems. The inspectors also reviewed the licensee's corrective action documents with respect to past flood-related items identified in the corrective action program to verify the adequacy of the corrective actions. The inspectors performed a walkdown of the following plant area to assess the adequacy of watertight doors and verify drains and sumps were clear of debris and were operable, and that the licensee complied with its commitments:

- 1B SX room flood hatch removed with 1A SX room sump pumps out-of-service.

This inspection constituted one internal flooding sample as defined in IP 71111.06-05.

b. Findings

No findings of significance were identified.

1R11 Licensed Operator Requalification Program (71111.11)

.1 Resident Inspector Quarterly Review (71111.11Q)

a. Inspection Scope

On March 9, 2010, the inspectors observed a crew of licensed operators (Crew 3) in the plant's simulator during licensed operator requalification examinations to verify that operator performance was adequate, evaluators were identifying and documenting crew performance problems, and training was being conducted in accordance with licensee procedures. The inspectors evaluated the following areas:

- licensed operator performance;
- crew's clarity and formality of communications;
- ability to take timely actions in the conservative direction;
- prioritization, interpretation, and verification of annunciator alarms;
- correct use and implementation of abnormal and emergency procedures;
- control board manipulations;
- oversight and direction from supervisors; and
- ability to identify and implement appropriate TS actions and Emergency Plan actions and notifications.

The crew's performance in these areas was compared to pre-established operator action expectations and successful critical task completion requirements. Documents reviewed are listed in the Attachment.

This inspection constituted one quarterly licensed operator requalification program sample as defined in IP 71111.11.

b. Findings

No findings of significance were identified.

1R12 Maintenance Effectiveness (71111.12)

.1 Routine Quarterly Evaluations (71111.12Q)

a. Inspection Scope

The inspectors evaluated degraded performance issues involving the following risk-significant systems:

- auxiliary building ventilation (VA), and
- Unit 2 chemical and volume control system.

The inspectors reviewed events such as where ineffective equipment maintenance had resulted in valid or invalid automatic actuations of engineered safeguards systems and independently verified the licensee's actions to address system performance or condition problems in terms of the following:

- implementing appropriate work practices;
- identifying and addressing common cause failures;
- scoping of systems in accordance with 10 CFR 50.65(b) of the maintenance rule;
- characterizing system reliability issues for performance;
- charging unavailability for performance;
- trending key parameters for condition monitoring;
- ensuring 10 CFR 50.65(a)(1) or (a)(2) classification or re-classification; and
- verifying appropriate performance criteria for structures, systems, and components (SSCs)/functions classified as (a)(2) or appropriate and adequate goals and corrective actions for systems classified as (a)(1).

The inspectors assessed performance issues with respect to the reliability, availability, and condition monitoring of the system. In addition, the inspectors verified maintenance effectiveness issues were entered into the CAP with the appropriate significance characterization. Documents reviewed are listed in the Attachment.

This inspection constituted two quarterly maintenance effectiveness samples as defined in IP 71111.12-05.

b. Findings

No findings of significance were identified.

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

.1 Maintenance Risk Assessments and Emergent Work Control

a. Inspection Scope

The inspectors reviewed the licensee's evaluation and management of plant risk for the maintenance and emergent work activities affecting risk-significant and safety-related equipment listed below to verify that the appropriate risk assessments were performed prior to removing equipment for work:

- Unit 1 AF flow loop calibration and steam dump work;
- emergent trip of 1B main generator stator cooling pump;
- 2A FW pump high lube oil differential pressure with 2C FW pump out-of-service;
- foreign material in the 1A main generator bus duct cooling fan; and
- nitrogen leak from valve 1FW009A.

These activities were selected based on their potential risk significance relative to the Reactor Safety Cornerstones. As applicable for each activity, the inspectors verified that risk assessments were performed as required by 10 CFR 50.65(a)(4) and were accurate and complete. When emergent work was performed, the inspectors verified that the plant risk was promptly reassessed and managed. The inspectors reviewed the scope of maintenance work, discussed the results of the assessment with the licensee's probabilistic risk analyst or shift technical advisor, and verified plant conditions were consistent with the risk assessment. The inspectors also reviewed TS requirements and walked down portions of redundant safety systems, when applicable, to verify risk analysis assumptions were valid and applicable requirements were met. Documents reviewed are listed in the Attachment.

These maintenance risk assessments and emergent work control activities constituted five samples as defined in IP 71111.13-05.

b. Findings

No findings of significance were identified.

1R15 Operability Evaluations (71111.15)

.1 Operability Evaluations

a. Inspection Scope

The inspectors reviewed the following issues:

- gas void identified downstream of valve 1SI8811A;
- 1B diesel generator (DG) SX flow low during reactor containment fan coolers (RCFC) surveillance;
- 2A component cooling water (CC) heat exchanger degradation;
- 2A RH pump degrading flow trend;
- 1B SI pump undersized shaft; and
- Review of Operability Evaluation for 1CC9412B blown fuse.

The inspectors selected these potential operability issues based on the risk significance of the associated components and systems. The inspectors evaluated the technical adequacy of the evaluations to ensure that TS operability was properly justified and the subject component or system remained available such that no unrecognized increase in risk occurred. The inspectors compared the operability and design criteria in the appropriate sections of the TS and UFSAR to the licensee’s evaluations, to determine whether the components or systems were operable. Where compensatory measures were required to maintain operability, the inspectors determined whether the measures in place would function as intended and were properly controlled. The inspectors determined, where appropriate, compliance with bounding limitations associated with the evaluations. Additionally, the inspectors also reviewed a sampling of corrective action documents to verify that the licensee was identifying and correcting any deficiencies associated with operability evaluations. Documents reviewed are listed in the Attachment.

Also, additional activities were performed during the evaluation of a gas void downstream of valve 1SI8811A that were associated with Temporary Instruction (TI) 2515/177, "Managing Gas Accumulation In Emergency Core Cooling, Decay Heat Removal, and Containment Spray Systems." These activities are described in Bullet .2 of this section.

This operability inspection constituted six samples as defined in IP 71111.15-05.

b. Findings

Failure to Correct a Condition Adverse to Quality

Introduction: The inspectors identified a finding of very low safety significance (Green) and associated Non-Cited Violation (NCV) of 10 CFR 50, Appendix B, Criterion XVI, "Corrective Action," for the licensee's failure to correct a Condition Adverse to Quality (CAQ) associated with the Unit 2A CC heat exchanger.

Description: On November 12, 2003, the licensee identified corrosion on the inlet channel flange surface of the 2A CC heat exchanger. At the time of discovery, the heat exchanger was out-of-service for planned maintenance. The licensee concluded that the heat exchanger was operable, but that the condition needed to be repaired by the next scheduled work window. The issue was documented in the CAP (Issue Report [IR] 186248) and a work request (WR) 120255 was initiated to schedule the repair.

Station Procedure LS-AA-120, "Issue Identification and Screening Process," Revision 11, defines a CAQ as an all-inclusive term used in reference to any of the following: failures, malfunctions, deficiencies, defective items, and non-conformances. Because the 2A CC heat exchanger was a safety-related, risk significant component, the licensee classified this issue as a CAQ consistent with the LS-AA-120 definition.

On January 17, 2005, the licensee identified that WR 120255 had been cancelled with no action taken for unknown reasons. This issue was documented in the CAP (IR 291515) and another WR 638037 was initiated to schedule the repair.

On April 9, 2008, the licensee identified that WR 638037 had been cancelled with no action taken for unknown reasons. The flange surface was inspected and although further degradation was observed, the licensee concluded that the heat exchanger was operable until the next refueling outage (A2R14; October 2009). This issue was captured in the CAP (IR 760868) and WR 291515 was initiated to schedule the repair, with no additional deferral.

On February 12, 2010, the licensee identified that WR 291515 was cancelled with no action taken for unknown reasons. Since the flange had not been inspected since 2008, the licensee performed a formal operability evaluation on the heat exchanger, which concluded that it was operable. The issue was captured in the CAP (IR 1029659) and

WR 773926 was initiated to repair the flange during the next refueling outage (A2R15 in April 2011).

Step 4.6.2 of station procedure LS-AA-125, “Corrective Action Program Procedure,” Revision 14, requires that corrective actions be created for any action necessary to restore a CAQ. Step 4.6 of LS-AA-125 allows corrective actions for CAQs to be closed to a work request, if the work request is cross-referenced to the CAP. The inspectors noted that all of the work requests to repair the heat exchanger had been properly cross-referenced; however, this cross-referencing did not prevent the work requests from being cancelled. The inspectors reviewed work history records and found no documentation regarding why the work requests had been cancelled.

The inspectors also identified that the licensee had not evaluated why the work requests had been cancelled despite having the appropriate cross-referencing. Station Procedure LS-AA-120, Attachment 2, lists several examples of items the licensee considers CAQs. One of the examples is “inadequate causal analysis resulting in: repeat level 1, 2, or 3 event or inappropriate corrective actions or corrective actions to prevent recurrence.” Therefore, according to the licensee’s CAP procedure, the failure to evaluate why the previous corrective actions to repair the heat exchanger were not implemented was a CAQ that should have been identified by the licensee. The licensee initiated IR 1035759 to address this concern.

<u>Analysis</u>: The inspectors determined that the licensee’s failure to identify a Condition Adverse to Quality (CAQ) associated with the failure to correct a CAQ on the 2A CC heat exchanger was a performance deficiency. Specifically, corrosion identified in 2003 had not been corrected as of 2010.

The inspectors evaluated the finding in accordance with IMC 0612, Appendix B, “Issue Screening.” This deficiency was considered more than minor because it was similar to example 3(g) in Appendix E of Inspection Manual Chapter (IMC) 0612, in that a CAQ was not corrected and it recurred, such that the operability of a mitigating system component was potentially affected. Specifically, the failure to repair the 2A CC heat exchanger resulted in it continuing to degrade over the last 7 years. As the corrosion has not been corrected, the heat exchanger could continue to degrade such that the performance deficiency could lead to a more significant event.

The inspectors performed a significance evaluation in accordance with IMC 0609, Attachment 4, “Determining the Significance of Reactor Inspection Findings for At-Power Situations.” Because there was no actual loss of operability or functionality of the 2A CC heat exchanger, the issue screened out as having very low safety significance (Green).

This finding is associated with the cross-cutting area component of corrective action program in the problem identification and resolution cross-cutting area. Specifically, the licensee did not thoroughly evaluate why work requests to correct degradation of the 2A CC heat exchanger were repeatedly cancelled with no actions taken and for unknown reasons (P.1(c)).

<u>Enforcement</u>: Title 10 CFR 50, Appendix B, Criterion XVI, “Corrective Action,” states, in part, that conditions adverse to quality such as failures, malfunctions, deficiencies, deviations, defective material and equipment and non-conformances are promptly identified and corrected. Contrary to the above, as of March 31, 2010, a CAQ first

identified in 2003 had not been corrected. Specifically, on November 23, 2003, corrosion was identified on the 2A CC heat exchanger flange and, as of March 31, 2010, no corrective action had been taken. Because this violation was of very low safety significance and was entered into the licensee's CAP, this violation is being treated as an NCV, consistent with Section VI.A.1 of the NRC Enforcement Policy. **(NCV 05000457/2010002-01, Failure to Identify a Condition Adverse to Quality)**

.2 Operability Evaluations associated with Temporary Instruction 2515/177, "Managing Gas Accumulation In Emergency Core Cooling, Decay Heat Removal, And Containment Spray Systems."

a. Inspection Scope

The inspectors reviewed the following issues associated with the scope of Generic Letter 2008-01, "Managing Gas Accumulation in Emergency Core Cooling, Decay Heat Removal, and Containment Spray Systems":

- gas void identified downstream of valve 1SI8811A.

The inspectors verified that the licensee has acceptably identified the gas intrusion mechanisms that apply to the licensee's plant. If the licensee's evaluation was incomplete, the inspectors verified that corrective actions were placed into the CAP (TI 2515/177, Section 04.02.e).

In addition, the inspectors verified that the licensee's void acceptance criteria were consistent with the Office of Nuclear Reactor Regulations' void acceptance criteria. If NRR's acceptance criteria were not met, then the inspectors verified that the licensee has justified the deviations. Also, the inspectors confirmed that (1) the licensee addressed the effect of pressure changes during system startup and operation since such changes could significantly affect the void fraction from the initial value; and (2) the range of flow conditions evaluated by the licensee was consistent with the full range of design basis and expected flow rates for various break sizes and locations (TI 2515/177, Section 04.02.f).

Documents reviewed are listed in the Attachment to this report. This inspection effort counts towards the completion of TI 2515/177 which will be closed in a later Inspection Report.

b. Findings

No findings of significance were identified.

1R18 Plant Modifications (71111.18)

.1 Temporary Plant Modifications

a. Inspection Scope

The inspectors reviewed the following temporary modification:

- 1CV121 valve packing leakoff measuring device.

The inspectors compared the temporary configuration changes and associated 10 CFR 50.59 screening and evaluation information against the design basis, the UFSAR, and the TS, as applicable, to verify that the modification did not affect the operability or availability of the affected systems. The inspectors also compared the licensee's information to operating experience information to ensure that lessons learned from other utilities had been incorporated into the licensee's decision to implement the temporary modification. The inspectors, as applicable, performed field verifications to ensure that the modifications were installed as directed; the modifications operated as expected; modification testing adequately demonstrated continued system operability, availability, and reliability; and that operation of the modifications did not impact the operability of any interfacing systems. Lastly, the inspectors discussed the temporary modification with operations, engineering, and training personnel to ensure that the individuals were aware of how extended operation with the temporary modification in place could impact overall plant performance. Documents reviewed in the course of this inspection are listed in the Attachment.

This inspection constituted one temporary modification sample as defined in IP 71111.18-05.

b. Findings

No findings of significance were identified.

.2 Failure to Perform a 10 CFR 50.59 Evaluation of a Temporary Modification to the 2B Reactor Vessel Level Indication System Probe

Introduction: The inspectors identified a finding of very low safety significance (Green) and an associated Severity Level IV NCV for the failure to perform a 10 CFR 50.59 evaluation of a temporary modification to the 2B reactor vessel level indication system (RVLIS). Specifically, the licensee failed to recognize the impact of a temporary modification on emergency operating procedures, which resulted in the failure to perform an evaluation of the modification against the criteria in 10 CFR 50.59(c)(2).

Description: This issue was previously discussed in section 1R18 of Inspection Report 05000456/2009005; 05000457/2009005 and did not constitute an additional temporary modification sample as defined in IP71111.18-05.

In November 2009, following a scheduled refueling outage, the licensee identified wiring damage associated with sensor #1 on the 2B RVLIS probe. There are a total of 8 sensors on a RVLIS probe, numbered #1 – 8 from top to bottom. Sensors #1 and #2 are in the head region and sensors #3 – 8 are in the plenum region between the reactor vessel flange and the top of active fuel. As a result of the circuit design and the wiring damage, the licensee installed a temporary modification (EC [Engineering Change] 377675) that jumpered the output signal from the #2 sensor to the #1 sensor. As a result of this modification, both sensors in the head region would output the level indicated by sensor #2.

The RVLIS is one of several systems that are designed to detect inadequate core cooling and were installed throughout the industry in accordance with NUREG-0737, "Clarification of TMI Action Plan Requirements." The design installed at Braidwood consists of two probes in the reactor vessel, each with eight sensors. The RVLIS control room indication displays two different levels, one for the head region and one for the plenum region. The installation of EC 377675 impacted the control room indication of the head region level for the 2B RVLIS probe. The system, as designed, would output a level reading of 100, 31, or 0 depending on if both, one, or none of the sensors were covered with water. With the temporary modification installed, the 2B RVLIS probe head region would read 100 if sensor #2 was covered and 0 if both sensors were uncovered. If only sensor #1 was uncovered, the display would read 100, indicating that both sensors were covered. The inspectors determined that this resulted in a potential non-conservative indication of reactor vessel level in the head region.

The inspectors reviewed EC 377675 and associated documents describing the RVLIS system. The potential non-conservative level indication was addressed in EC 377675, which included the following statement: "for a situation where the reactor level is between the #1 and #2 sensor locations, the 2B RVLIS probe would indicate that level is one step higher than it actually is." The EC referenced an Operator Aid that was created to explain this impact on the RVLIS system. When the inspectors questioned several Operators about the status of the RVLIS system, knowledge of this Operator Aid and the impact of EC 377675 on RVLIS indication was not consistently demonstrated. As a result, additional training on the status of the RVLIS system was provided to Operators.

The inspectors reviewed the licensee's 10 CFR 50.59 screening for EC 377675 and noted that all questions were answered 'no,' which means the licensee concluded that the modification did not require a full evaluation against the criteria in 10 CFR 50.59(c)(2) or NRC approval prior to implementation. The inspectors questioned Operations on the potential impact of EC 377675 on steps in emergency operating procedures and abnormal procedures, since some steps direct Operators to look at RVLIS indication prior to making a decision, (e.g., starting a reactor coolant pump). Based on the inspectors' questions, the licensee's Operations Department reviewed the changes made by EC 377675 against their procedures and determined that approximately 25 emergency operating and abnormal procedures needed to be revised. The revisions directed operators to check RVLIS train 2A rather than train 2B when establishing conditions to start a reactor coolant pump or verifying whether a steam void is present in the reactor vessel. As a result of the necessary procedure changes, the licensee concurred with the inspectors' position that Question 2 of the 10 CFR 50.59 screening sheet should have been answered 'yes', which requires a full evaluation of the modification. The licensee plans to perform a full evaluation of EC 377675 to determine whether the issue required NRC approval prior to implementation.

<u>Analysis</u>: The inspectors reviewed the issue of concern in accordance with IMC 0612, Appendix B, "Issue Screening." The issue of concern was determined to not involve a willful aspect. The inspectors determined that the failure to perform a required 10 CFR 50.59 evaluation was a performance deficiency. Because the performance deficiency is associated with a 10 CFR 50.59 issue, it is defined as one that impacted the regulatory process and is treated under traditional enforcement. Supplement I of the NRC Enforcement Policy provides guidance on the disposition of traditional enforcement violations associated with reactor operations. In reviewing Supplement I, the inspectors concluded that the violation was more than minor because the inspectors could not reasonably conclude that the modification would not require prior NRC approval based on the information in the 10 CFR 50.59 screening. Supplement I directs inspectors to

screen the issue through the SDP to determine the appropriate severity level of the violation.

The inspectors performed a significance evaluation in accordance with IMC 0609, Attachment 4. The inspectors answered 'no' to the Mitigating Systems cornerstone questions in Table 4 and, as a result, the issue screens as one of very low safety significance (Green). A traditional enforcement violation that screens as Green in the SDP is defined by Supplement I of the NRC Enforcement Policy as a Severity Level IV Violation.

This finding is associated with the cross-cutting area component of decision-making in the human performance cross-cutting area. Specifically, when evaluating the operations impact of a new temporary modification on the 2B RVLIS probe, the licensee assumed the impact was unchanged from a prior temporary modification on the same equipment, which resulted in necessary procedure changes that were not identified (H.1(b)).

Enforcement: Title 10 CFR 50.59(c)(1) requires, in part, that licensees evaluate changes in the facility as described in the UFSAR only if the change does not meet any of the criteria in paragraph (c)(2) of that section. Contrary to the above, the licensee did not perform an evaluation against the criteria in 10 CFR 50.59(c)(2) prior to implementation of a temporary modification that required procedure changes that adversely affected how the design function of RVLIS was controlled. Because this violation was of very low safety significance and was entered into the licensee's CAP (IR 01054778), this violation is being treated as an NCV, consistent with Section VI.A.1 of the NRC Enforcement Policy. **(Severity Level IV NCV 05000457/2010002-02, Failure to Perform a 10 CFR 50.59 Evaluation of a Temporary Modification to the 2B RVLIS Probe)**

1R19 Post-Maintenance Testing

.1 Quarterly Post-Maintenance Testing

a. Inspection Scope

The inspectors reviewed the following post-maintenance activities to verify that procedures and test activities were adequate to ensure system operability and functional capability:

- Unit 2 and Unit 2 CC9412 valves control power fuse replacements;
- 1B SI pump following work window;
- Unit 1 moveable incore detectors;
- 1SI8811B valve following maintenance;
- 0B control room ventilation system chiller following work window; and
- 1B SG power operated relief valve following card replacement.

These activities were selected based upon the structure, system, or component's ability to impact risk. The inspectors evaluated these activities for the following (as applicable): the effect of testing on the plant had been adequately addressed; testing was adequate for the maintenance performed; acceptance criteria were clear and demonstrated operational readiness; test instrumentation was appropriate; tests were performed as written in accordance with properly reviewed and approved procedures; equipment was returned to its operational status following testing (temporary modifications or jumpers required for test performance were properly removed after test completion); and test documentation was properly evaluated. The inspectors evaluated the activities against TS, the UFSAR, 10 CFR Part 50 requirements, licensee procedures, and various NRC generic communications to ensure that the test results adequately ensured that the equipment met the licensing basis and design requirements. In addition, the inspectors reviewed corrective action documents associated with post-maintenance tests to determine whether the licensee was identifying problems and entering them in the CAP and that the problems were being corrected commensurate with their importance to safety. Documents reviewed are listed in the Attachment.

This inspection constituted six post-maintenance testing samples as defined in IP 71111.19-05.

b. Findings

No findings of significance were identified.

.2 (Closed) Unresolved Item 05000456/2009005-06; 05000457/2009005-06: Reactor Coolant System Resistance Temperature Detector Cross-Calibration

Unresolved item 05000456/2009005-06; 05000457/2009005-06 was opened in Inspection Report 05000456/2009005; 05000457/2009005 based on inspector review of reactor coolant system (RCS) Resistance Temperature Detector (RTD) cross-calibration as part of post-maintenance testing following the Unit 2 refueling outage in October 2009. The licensing basis for the RTD cross-calibration methodology is contained in NUREG/CR-5560. Section 23 of NUREG/CR-5560 discusses inherent uncertainties that must be included in certain methodologies of RTD cross-calibration. At the end of the fourth quarter 2009 inspection period, the inspectors were unable to verify that the appropriate uncertainties were included in the licensee's cross-calibration test results, and an unresolved item was opened.

Since the conclusion of that inspection period, the inspectors have had additional discussions with NRC personnel from the Office of Nuclear Reactor Regulation and licensee staff responsible for carrying out RTD cross-calibration at Braidwood. Based on these conversations, the inspectors were able to verify that an appropriate methodology and uncertainties were being used for RTD cross-calibration at Braidwood. This Unresolved Item is closed and did not constitute an additional sample.

1R22 Surveillance Testing (71111.22)

.1 Quarterly Surveillance Testing

a. Inspection Scope

The inspectors reviewed the test results for the following activities to determine whether risk-significant systems and equipment were capable of performing their intended safety function and to verify testing was conducted in accordance with applicable procedural and TS requirements:

- Unit 1 RCS leakrate and 1CV121 leakoff calculation (RCS leakage detection);

- 1B DG monthly surveillance with turbocharger spindown (Routine);
- 1B AF pump surveillance (Inservice Testing);
- 2A DG hot restart (Routine);
- Unit 1 emergency core cooling system (ECCS) ultrasonic testing (UT) and vent and valve surveillance (Routine); and
- 0B fire pump National Fire Protection Agency (NFPA) annual surveillance (Routine).

The inspectors observed in-plant activities and reviewed procedures and associated records to determine the following:

- did preconditioning occur;
- were the effects of the testing adequately addressed by control room personnel or engineers prior to the commencement of the testing;
- were acceptance criteria clearly stated, demonstrated operational readiness, and consistent with the system design basis;
- plant equipment calibration was correct, accurate, and properly documented;
- as-left setpoints were within required ranges; and the calibration frequency were in accordance with TSs, the UFSAR, procedures, and applicable commitments;
- measuring and test equipment calibration was current;
- test equipment was used within the required range and accuracy; applicable prerequisites described in the test procedures were satisfied;
- test frequencies met TS requirements to demonstrate operability and reliability; tests were performed in accordance with the test procedures and other applicable procedures; jumpers and lifted leads were controlled and restored where used;
- test data and results were accurate, complete, within limits, and valid;
- test equipment was removed after testing;
- where applicable for inservice testing activities, testing was performed in accordance with the applicable version of Section XI, American Society of Mechanical Engineers code, and reference values were consistent with the system design basis;
- where applicable, test results not meeting acceptance criteria were addressed with an adequate operability evaluation or the system or component was declared inoperable;
- where applicable for safety-related instrument control surveillance tests, reference setting data were accurately incorporated in the test procedure;
- where applicable, actual conditions encountering high resistance electrical contacts were such that the intended safety function could still be accomplished;
- prior procedure changes had not provided an opportunity to identify problems encountered during the performance of the surveillance or calibration test;
- equipment was returned to a position or status required to support the performance of its safety functions; and
- all problems identified during the testing were appropriately documented and dispositioned in the CAP.

Also, additional activities were performed during the review of the Unit 1 ECCS UT and vent and valve surveillances that were associated with TI 2515/177, “Managing Gas

Accumulation in Emergency Core Cooling, Decay Heat Removal, and Containment Spray Systems." These activities are described in bullet .2 of this section.

Documents reviewed are listed in the Attachment. This inspection constituted four routine surveillance testing samples, one inservice testing sample, and RCS leakage detection inspection sample as defined in IP 71111.22, Sections -02 and -05.

b. Findings

No findings of significance were identified.

.2 Surveillance Testing associated with Temporary Instruction 2515/177, "Managing Gas Accumulation In Emergency Core Cooling, Decay Heat Removal, And Containment Spray Systems."

a. Inspection Scope

When reviewing the Unit 1 ECCS UT and vent and valve surveillances the inspectors verified that the procedures were acceptable for (1) testing ECCS systems with power operation, shutdown operation, maintenance, and ECCS system modifications, (2) void determination and elimination methods, and (3) post-event evaluation.

The inspectors reviewed procedures used for conducting surveillances and determination of void volumes to ensure that the void criteria was satisfied and will be reasonably ensured to be satisfied until the next scheduled void surveillance (TI 2515/177, Section 04.03.a). Also, the inspectors reviewed procedures used for filling and venting following conditions which may have introduced voids into the subject systems to verify that the procedures acceptably addressed testing for such voids and provided acceptable processes for their reduction or elimination (TI 2515/177, Section 04.03.b). Specifically, the inspectors verified that:

- Gas intrusion prevention, refill, venting, monitoring, trending, evaluation, and void correction activities were acceptably controlled by approved operating procedures (TI 2515/177, Section 04.03.c.1).
- Procedures ensured the system did not contain voids that may jeopardize operability (TI 2515/177, Section 04.03.c.2).
- Procedures established that void criteria were satisfied and will be reasonably ensured to be satisfied until the next scheduled void surveillance (TI 2515/177, Section 04.03.c.3).
- The licensee entered changes into the CAP as needed to ensure acceptable response to issues. In addition, the inspectors confirmed that a clear schedule for completion is included for CAP entries that have not been completed (TI 2515/177, Section 04.03.c.5).
- Procedures included independent verification that critical steps were completed (TI 2515/177, Section 04.03.c.6).

The inspectors verified the following with respect to surveillance and void detection:

- Specified surveillance frequencies were consistent with TS surveillance requirements (TI 2515/177, Section 04.03.d.1).

- Surveillance frequencies were stated or, when conducted more often than required by TSs, the process for their determination was described (TI 2515/177, Section 04.03.d.2).
- Surveillances methods were acceptably established to achieve the needed accuracy (TI 2515/177, Section 04.03.d.3).
- Surveillance procedures included up-to-date acceptance criteria (TI 2515/177, Section 04.03.d.4).
- Procedures included effective follow-up actions when acceptance criteria are exceeded or when trending indicates that criteria may be approached before the next scheduled surveillance (TI 2515/177, Section 04.03.d.5).
- Measured void volume uncertainty was considered when comparing test data to acceptance criteria (TI 2515/177, Section 04.03.d.6).
- Venting procedures and practices utilized criteria such as adequate venting durations and observing a steady stream of water (TI 2515/177, Section 04.03.d.7).
- An effective sequencing of void removal steps was followed to ensure that gas does not move into previously filled system volumes (TI 2515/177, Section 04.03.d.8).
- Qualitative void assessment methods included expectations that the void will be significantly less that allowed by acceptance criteria (TI 2515/177, Section 04.03.d.9).
- Venting results were trended periodically to confirm that the systems are sufficiently full of water and that the venting frequencies are adequate. The inspectors also verified that records on the quantity of gas at each location are maintained and trended as a means of preemptively identifying degrading gas accumulations (TI 2515/177, Section 04.03.d.10).
- Surveillances were conducted at any location where a void may form, including high points, dead legs, and locations under closed valves in vertical pipes (TI 2515/177, Section 04.03.d.11).
- The licensee ensure that systems were not pre-conditioned by other procedures that may cause a system to be filled, such as by testing, prior to the void surveillance (TI 2515/177, Section 04.03.d.12).
- Procedures included gas sampling for unexpected void increases if the source of the void is unknown and sampling is needed to assist in determining the source (TI 2515/177, Section 04.03.d.13).

The inspectors verified the following with respect to filling and venting:

- Revisions to fill and vent procedures to address new vents or different venting sequences were acceptably accomplished (TI 2515/177, Section 04.03.e.1).
- Fill and vent procedures provided instructions to modify restoration guidance to address changes in maintenance work scope or to reflect different boundaries from those assumed in the procedure (TI 2515/177, Section 04.03.e.2).

The inspectors verified the following with respect to void control:

- Void removal methods were acceptably addressed by approved procedures (TI 2515/177, Section 04.03.f.1).

- The licensee had reasonably ensured that the Unit 1 ECCS pumps are free of damage following a gas-related event in which pump acceptance criteria was exceeded (TI 2515/177, Section 04.03.f.2).

Documents reviewed are listed in the Attachment.

This inspection effort counts towards the completion of TI 2515/177 which will be closed in a later Inspection Report.

a. Findings

No findings of significance were identified.

1EP6 Drill Evaluation (71114.06)

.1 Emergency Preparedness Drill Observation

a. Inspection Scope

The inspectors evaluated the conduct of a routine licensee emergency drill on February 10, 2010, to identify any weaknesses and deficiencies in classification, notification, and protective action recommendation development activities. The inspectors observed emergency response operations in the Technical Support Center to determine whether the event classification, notifications, and protective action recommendations were performed in accordance with procedures. The inspectors also attended the licensee drill critique to compare any inspector-observed weakness with those identified by the licensee staff in order to evaluate the critique and to verify whether the licensee staff was properly identifying weaknesses and entering them into the corrective action program. As part of the inspection, the inspectors reviewed the drill package and other documents listed in the Attachment.

This emergency preparedness drill inspection constituted one sample as defined in IP 71114.06-05.

b. Findings

No findings of significance were identified.

4. OTHER ACTIVITIES

4OA1 Performance Indicator Verification (71151)

.1 Unplanned Scrams per 7000 Critical Hours

a. Inspection Scope

The inspectors sampled licensee submittals for the Unplanned Scrams per 7000 Critical Hours performance indicator (PI) for Braidwood Unit 1 and Unit 2. To determine the accuracy of the PI data reported during those periods, PI definitions and guidance contained in the Nuclear Energy Institute (NEI) Document 99-02, "Regulatory Assessment Performance Indicator Guideline," Revision 6, were used. The inspectors reviewed the licensee's operator narrative logs, issue reports, event reports and NRC Inspection Reports for the period from January 1 through December 31, 2009, to validate the accuracy of the submittals. The inspectors also reviewed the licensee's IR database to determine if any problems had been identified with the PI data collected or transmitted for this indicator and none were identified. Documents reviewed are listed in the Attachment.

This inspection constituted of two unplanned scrams per 7000 critical hours samples as defined in IP 71151-05.

b. Findings

No findings of significance were identified.

.2 Unplanned Scrams with Complications

a. Inspection Scope

The inspectors sampled licensee submittals for the Unplanned Scrams with Complications performance indicator for Braidwood Unit 1 and Unit 2. To determine the accuracy of the PI data reported during those periods, PI definitions and guidance contained in the NEI 99-02, Revision 6, were used. The inspectors reviewed the licensee's operator narrative logs, issue reports, event reports and NRC Inspection Reports for the period from January 1 through December 31, 2009, to validate the accuracy of the submittals. The inspectors also reviewed the licensee's IR database to determine if any problems had been identified with the PI data collected or transmitted for this indicator and none were identified. Documents reviewed are listed in the Attachment.

This inspection constituted two unplanned scrams with complications samples as defined in IP 71151-05.

b. Findings

No findings of significance were identified.

.3 Unplanned Transients per 7000 Critical Hours

a. Inspection Scope

The inspectors sampled licensee submittals for the Unplanned Transients per 7000 Critical Hours PI for Braidwood Unit 1 and Unit 2. To determine the accuracy of the PI data reported during those periods, PI definitions and guidance contained in the NEI Document 99-02, Revision 6, were used. The inspectors reviewed the licensee's operator narrative logs, issue reports, maintenance rule records, event reports and NRC Inspection Reports for the period from January 1 through December 31, 2009, to validate the accuracy of the submittals. The inspectors also reviewed the licensee's IR database to determine if any problems had been identified with the PI data collected or transmitted for this indicator and none were identified. Documents reviewed are listed in the Attachment.

This inspection constituted two unplanned transients per 7000 critical hours samples as defined in IP 71151-05.

b. Findings

No findings of significance were identified.

4OA2 Identification and Resolution of Problems (71152)

Cornerstones: Initiating Events, Mitigating Systems, Barrier Integrity, Emergency Preparedness, Public Radiation Safety, Occupational Radiation Safety, and Physical Protection

.1 Routine Review of Items Entered into the Corrective Action Program

a. Inspection Scope

As part of the various baseline inspection procedures 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 CAP at an appropriate threshold, that adequate attention was being given to timely corrective actions, and that adverse trends were identified and addressed. Attributes reviewed included: the complete and accurate identification of the problem; that timeliness was commensurate with the safety significance; that evaluation and disposition of performance issues, generic implications, common causes, contributing factors, root causes, extent-of-condition reviews, and previous occurrences reviews were proper and adequate; and that the classification, prioritization, focus, and timeliness of corrective actions were commensurate with safety and sufficient to prevent recurrence of the issue. Minor issues entered into the licensee's CAP as a result of the inspectors' observations are included in the Attachment.

These routine reviews for the identification and resolution of problems did not constitute any additional inspection samples. Instead, by procedure they were considered an integral part of the inspections performed during the quarter and documented in Section 1 of this report.

b. Findings

No findings of significance were identified.

.2 Daily Corrective Action Program Reviews

a. Inspection Scope

In order to assist with the identification of repetitive equipment failures and specific human performance issues for follow-up, the inspectors performed a daily screening of items entered into the licensee's CAP. This review was accomplished through inspection of the station's daily condition report packages.

These daily reviews were performed by procedure as part of the inspectors' daily plant status monitoring activities and, as such, did not constitute any separate inspection samples.

b. Findings

No findings of significance were identified.

.3 Selected Issue Follow-Up Inspection: Elevated Tritium in Found in Auxiliary Building Water Puddles

a. Inspection Scope

During a review of items entered in the licensee's CAP, the inspectors recognized a corrective action item documenting elevated tritium results from samples taken of water that was leaking into the auxiliary building near the ECCS containment sump suction valves for both Units. The inspectors monitored and reviewed the results of troubleshooting to determine the source of the water and the elevated tritium. The troubleshooting concluded that the water puddles were caused by groundwater leakage into the auxiliary building. The troubleshooting also concluded that the elevated tritium was not present in the groundwater outside of the auxiliary building. This was validated when clean water samples placed in the same auxiliary building general area as the water puddles also developed elevated tritium levels within a day. In addition, routine samples of groundwater monitoring wells in the vicinity of the in-leakage have not shown signs of elevated tritium values and water in-leakage to other plant areas from the same groundwater vicinity have not shown the same elevated tritium levels.

The inspectors discussed with the licensee potential sources of tritium in the vicinity and the transfer mechanism of the tritium to the water on the floor. Although the licensee could not identify the source of the tritium in the vicinity of the ECCS containment sump suction valves, the licensee concluded that airborne tritium was diffusing into the water containers. The licensee took airborne samples and verified that there was no threat to personnel in the area; the derived air concentration was found to be approximately 0.05. The inspectors reviewed and discussed the licensee's calculations and were satisfied that the airborne tritium represented no increased threat to personnel in the area.

During the inspectors' review of this issue, no violations of NRC requirements were identified. This was based on the licensee's verification that the elevated tritium was not present in groundwater and there was no hazard to personnel in the auxiliary building due to airborne tritium.

This review constituted one in-depth problem identification and resolution sample as defined in IP 71152-05.

b. Findings

No findings of significance were identified.

4OA3 Follow-Up of Events and Notices of Enforcement Discretion (71153)

.1 Retraction of Event Notification 45104, Loss of Control Power to ECCS Valves

a. Inspection Scope

On May 29, 2009, the licensee reported Event Notification (EN) 45104, which documented the loss of control power to a safety-related motor control center (MCC) that powers valves associated with both trains of the ECCS. The MCC is normally de-energized to maintain valve power removed in accordance with TS. Loss of control power would prevent operation of these valves, which would prevent realignment of the ECCS for cold leg and hot leg recirculation. The licensee found a blown control power fuse and replaced the fuse within 2 hours of identifying the loss of control power.

On June 8, 2009, the licensee submitted a retraction of EN 45104. Further investigation by the licensee of the May 29, 2009, event concluded that the 1B ECCS train would have been able to perform its design function of cold and hot leg recirculation with the MCC de-energized. The inspectors reviewed the Event Retraction, discussed the issue with engineering and operations personnel, reviewed drawings and procedures, and concluded that the Event Retraction was appropriate.

Documents reviewed in this inspection are listed in the Attachment. This event follow-up review constituted one sample as defined in IP 71153-05.

b. Findings

No findings of significance were identified.

.2 (Open) Licensee Event Report 05000457/2009-003-00: Drain Procedure for Emergency Core Cooling System Suction Line Creates an Unanalyzed Condition Due to Inadequate Configuration

Due to an event that occurred at another site regarding an on-line work window in which water was drained from a line without controlling the vent and drain valves used to perform the draining evolution, the licensee reviewed their operating history. Based on this review, the licensee determined that similar configurations occurred at Braidwood during RH pump work windows on December 7, 2006, and September 30, 2009.

The inspectors have not yet completed their review of this issue as of the end of this inspection period. Documents reviewed as part of this inspection are listed in the Attachment. This event follow-up review constituted one sample as defined in IP 71153-05. This LER remains open.

.3 Performance of Troubleshooting Leads to Auxiliary Building Ventilation Fan Fire

a. Inspection Scope

On January 9, 2010, the licensee notified the NRC (EN 45618) of a Notification of Unusual Event (UE) due to a fire in the auxiliary building not extinguished within 15 minutes. The fire was near the inboard bearing of an auxiliary building ventilation

(VA) supply fan and was extinguished by the site fire brigade. There was no impact to the operation of either Unit.

b. Findings

Introduction: A finding of very low safety significance and an associated NCV of 10 CFR 50, Appendix B, Criterion V, Procedures, was self-revealed when, on January 9, 2010, VA fan 0VA01CC caught fire, resulting in the declaration of a UE. Specifically, troubleshooting performed on the inboard fan bearing in spring 2009 changed the bearing oil level without proper limits established, which led to bearing failure due to lack of lubrication.

Description: At 7:25 p.m., on January 9, 2010, the Braidwood MCR received an emergency call from workers in the field reporting smoke in the VA supply plenum. The fire brigade was dispatched and reported that a small puddle of oil was on fire near VA supply fan 0VA01CC. The fan was shut down and the fire brigade used a dry chemical fire extinguisher to extinguish the fire. The MCR received a report from the fire brigade that the fire was extinguished at 7:41 p.m., 16 minutes after the initial call to the MCR. The licensee declared a UE per Emergency Action Level HU6 for a fire not extinguished within 15 minutes of notification to the MCR. The licensee reported the fire to the NRC as EN 45618, in accordance with 10 CFR 50.72(a)(1)(i). At 9:11 p.m., on January 9, 2010, the licensee terminated the UE.

The licensee's initial investigation into the fire determined that the inboard fan bearing had catastrophically failed and the oil level was below the minimum setting for the bearing. Based on this information and vendor documentation, the licensee determined the bearing failed due to lack of lubrication. Vendor documentation states that setting of the oil bubbler assembly in reference to the bearing oil level is critical to maintaining the health of the fan bearing. There are two licensee procedures that address maintenance on VA supply fans, Procedure MA-AP-734-418, "Joy Model 72-36-1770 VA Supply Fan Maintenance," and Procedure BwMS 3150-039, "VA Fan Preventive Maintenance Inspection." Procedure MA-AP-734-418 provides an inboard fan bearing oil level band of 3/16 inch to 7/32 inch above the inside of the outer race of the inboard fan bearing. Procedure BwMS 3150-039 does not cover setting of the oil bubbler.

The inspectors reviewed the recent operating and maintenance history for the 0VA01CC supply fan and the licensee's Apparent Cause Evaluation. After correctly setting the inboard bearing oil level in September 2006, the inboard bearing oil consumption was roughly 1 quart per month, which is almost the entire bearing housing volume. The licensee opened WO 1020579 to adjust the oil level per Procedure MA-AP-734-418, and scheduled it for January 2008. The scheduled date was then moved to December 2008 due to resources. However, prior to performing WO 1020579, the licensee initiated IR 739631, in February 2008, to request troubleshooting activities. Recommended actions in IR 739631 were to lower the oil bubbler by 1/32" to 1/16," record the oil level, run the fan for 72 hours, then record the oil level again. The bubbler could be adjusted more than once if necessary. If the troubleshooting resolved the oil consumption issue then WO 1020579 could be cancelled. As a result, WO 1108896 was opened to perform the troubleshooting.

The scope of WO 1108896 was to make minor adjustments to the inboard and outboard bearing oil positions, as directed by the System Manager, to minimize oil leakage and find the ideal oil consumption position for the oil bubbler. A limitation on how much the oil bubbler could be lowered and an action to follow-up on the oil level after making adjustments were not included in WO 1108896. The licensee lowered the oil bubbler four times between March and May 2009 and the final oil level was 0.1375," which is lower than the oil level band prescribed in Procedure MA-AP-734-418. Following the oil bubbler adjustments in spring 2009, oil consumption by the inboard bearing went to zero, which eventually led to overheating and failure of the bearing on January 9, 2010. Following the fire, the fan was removed from service for repairs and remained out of service at the conclusion of the inspection period.

Analysis: The inspectors determined that the failure to properly adjust the oil bubbler and achieve an acceptable oil level for the inboard fan bearing was a performance deficiency. The inspectors reviewed IMC 0612, Appendix B, "Issue Screening," and determined the finding was more than minor because it impacted the SSC and Barrier Performance attribute of the Barrier Integrity Cornerstone objective to provide reasonable assurance that physical design barriers (fuel cladding, reactor coolant system, and containment) protect the public from radionuclide releases caused by accidents or events.

The inspectors performed a Phase 1 SDP review of this finding using the guidance provided in IMC 0609, Attachment 4, "Initial Screening and Characterization of Findings." Based on Tables 2, "Cornerstones and Functions Degraded as a Result of the Deficiency," and 4a, "Characterization Worksheet for Initiating Events, Mitigating Systems, and Barrier Integrity Cornerstones," in IMC 0609, Attachment 4, the inspectors determined the finding only represented a degradation, rather than a loss, of the radiological barrier function provided for the auxiliary building. As a result of that determination, the issue screened as one of very low safety significance (Green).

This finding is associated with the cross-cutting area component of resources in the Human Performance cross-cutting area. Specifically, the work instructions for troubleshooting did not contain adequate guidance to adjust the oil bubbler without causing an adverse equipment impact (H.2(c)).

Enforcement: Licensee procedure MA-AA-716-004, Conduct of Troubleshooting, requires troubleshooting limits or boundaries to be established to bound the effects of troubleshooting and prevent creating an undesired or unanalyzed equipment configuration. Title 10 CFR Part 50, Appendix B, Criterion V, "Procedures," requires, in part, that activities affecting quality shall be prescribed by documented instructions or procedures of a type appropriate to the circumstances, shall be accomplished in accordance with those instructions or procedures, and acceptance criteria shall be included in instructions or procedures to determine that important activities have been satisfactorily accomplished. Contrary to the above, troubleshooting performed under WO 1108896 on VA supply fan 0VA01CC during spring 2009 did not include an acceptable oil level band when the inboard fan bearing oil level was adjusted. Performance of the troubleshooting resulted in low bearing oil level, which led to bearing failure on January 9, 2010. Because this violation was of very low safety significance and was entered into the licensee's CAP as IR 1014513, this violation is being treated as a NCV, consistent with Section VI.A.1 of the NRC Enforcement Policy.

(NCV 05000456/2010002-03; 05000457/2010002-03, Performance of Troubleshooting Leads to Auxiliary Building Ventilation Fan Fire)

This event follow-up review constituted one sample as defined in IP 71153-05.

4OA5 Other Activities

.1 (Closed) Unresolved Item 05000456/2009006-02; 05000457/2009006-02: Diesel Oil Storage Tank Room Sprinkler Obstructions

a. Inspection Scope

An Unresolved Item (URI) was opened during the 2009 triennial fire protection inspection regarding the licensee's failure to provide foam sprinklers in the 2B diesel oil storage tank room that were free of obstructions.

The inspectors completed follow-up review of this issue and determined that the URI could be closed for both units. The inspectors' review of this issue was considered to be a part of the original inspection effort, and as such did not constitute any additional inspection samples.

b. Findings

(1) Diesel Oil Storage Tank Room Sprinkler Obstructions

Introduction: A finding of very low safety-significance (Green) and an associated NCV of Unit 2 License Condition 2.E was identified by the inspectors for the licensee's failure to provide foam sprinklers in the 2B diesel oil storage tank room that were free of obstructions. Specifically, the licensee failed to install all of the foam sprinklers in accordance with NFPA-16-1980, "Standard for the Installation of Deluge Foam-Water Sprinkler Systems and Foam-Water Spray Systems," and NFPA-13-1985, "Standard for the Installation of Sprinkler Systems."

Description: Unresolved Item 05000456/2009006-02; 05000457/2009006-02 was opened during the 2009 triennial fire protection inspection; initially the item was determined to apply to both units, it was later determined the issue was only applicable to Unit 2.

During that inspection, the inspectors identified significant obstructions to sprinkler discharge in the 2B diesel oil storage tank room. Two of the sprinklers were each located between two parallel ventilation ducts in the west portion of the room. The ventilation ducts were located approximately 39 inches apart where one of the sprinklers was located and 21 inches apart where the second sprinkler was located. The inspectors noted that the discharge from both sprinklers would be significantly obstructed by the ventilation ducts in two directions. In addition, one sprinkler, located in the northeast corner of the room, was located within a few inches of a ventilation duct thereby resulting in significantly obstructed discharge in one direction. All three sprinklers were less than 1 foot away from a ventilation duct with the deflectors located several inches above the bottom of the ventilation ducts.

The sprinkler system installed in the 2B diesel oil storage tank room was a foam sprinkler system, which was required to meet the specifications of NFPA-16-1980, “Standard for the Installation of Deluge Foam-Water Sprinkler Systems and Foam-Water Spray Systems.” Section 4.2.1 of NFPA-16-1980 specified that foam-water sprinkler systems and foam-water spray systems conform to all applicable requirements for listed NFPA standards except where otherwise specified. Section 4.2.1 of NFPA-16-1980 listed NFPA-13, “Sprinkler Systems,” as one of the listed standards. Chapter 3 of the Fire Protection Report indicated that the licensee was committed to NFPA-13-1985 and NFPA-16-1980 for Braidwood Station. Section 4-2.4.6 of NFPA-13-1985 specified that deflectors of sprinklers in bays shall be at sufficient distances from the beams, as shown in NFPA-13-1985 Table 4-2.4.6 and NFPA-13-1985 Figure 4-2.4.6, to avoid obstruction to the sprinkler discharge pattern. Table 4-2.4.6 of NFPA-13-1985 specified a maximum allowable distance above the bottom of the beam of zero inches for deflectors for sprinklers having a distance of less than one foot from beams. The configuration of the three sprinklers discussed above was similar to that of the beams discussed in Section 4-2.4.6 of NFPA-13-1985, in that the ventilation ducts provided obstructions similar to structural beams.

The inspectors also identified that a 60 × 75 inch platform was located in the northwest corner of the 2B diesel oil storage tank room that substantially obstructed discharge from sprinklers. No sprinkler was located underneath the platform. Section 4-4.11 of NFPA-13-1985 specified that sprinklers be installed underneath decks and galleries over four feet wide.

During the 2009 triennial fire protection inspection, the licensee presented the argument that the obstruction requirements of NFPA-13 did not apply to NFPA-16 foam suppression systems. The licensee attempted to obtain a formal code interpretation from the NFPA on the issue. The NFPA denied the request to provide a formal interpretation because the existing code text clearly and decisively provided the requested information. The NFPA fire protection specialist responding to the request noted that sprinklers are required below open grate flooring if the flooring is wider than four feet and that other obstruction rules of NFPA-13 applied. The Office of Nuclear Reactor Regulation, who is the Authority Having Jurisdiction, was contacted by the inspectors and Nuclear Reactor Regulation agreed that the obstruction rules of NFPA-13 applied to NFPA-16 foam systems. The licensee entered the issue into their corrective action program as IR 809865, “NRC Issues with DOST Foam Sprinkler System Design,” dated August 22, 2008. The licensee performed an initial evaluation and determined that the system was operable but degraded. The licensee planned to evaluate the system and determine what modifications were required.

<u>Analysis</u>: The inspectors determined that the failure to provide foam sprinklers in the 2B diesel oil storage tank room that were free of obstructions was contrary to the requirements of NFPA-13-1985 and NFPA-16-1980, as referenced by the licensee’s fire protection program, and was a performance deficiency.

The inspectors reviewed the issue in accordance with IMC 0612, Appendix B, “Issue Screening.” The finding was determined to be more than minor because the finding was associated with the Mitigating Systems cornerstone attribute of Protection Against External Factors (Fire) and affected the cornerstone objective of ensuring the capability of systems to respond to initiating events such as fire. Specifically, the discharge of the foam spray may not reach a fire and could prevent the extinguishing agent from suppressing and extinguishing a diesel fuel oil spill fire because of the proximity of obstructions to the sprinklers. The installed foam spray sprinkler system is designed to provide full protection by overlapping the sprinkler heads' radii of coverage. This overlapping coverage can be rendered ineffective due to obstructions that block the sprinklers' effective range. Obstructions prevent cooling foam from reaching the fire or from pre-wetting the surrounding fuels.

In accordance with IMC 0609, "Significance Determination Process," Attachment 0609.04, "Phase 1 - Initial Screening and Characterization of Findings," Table 3b, the inspectors determined the finding degraded the fire protection defense-in-depth strategies. Therefore, screening under IMC 0609, Appendix F, "Fire Protection Significance Determination Process," was required. During the Phase 1 evaluation, the finding was assigned to the finding category "Fixed Fire Protection Systems." The finding was assigned a moderate degradation rating because the foam would still be able to cover most of the room despite obstructions near three of the sprinklers. The inspectors noted that a fire in the 2B diesel oil storage tank room would only affect the associated emergency diesel generator and no other equipment would be affected. Therefore, the inspectors determined that a fire scenario involving a diesel oil storage tank room would be equivalent to a Fire Damage State of FDS0 as described in Step 2.2, "Fire Damage State Determination," of IMC 0609, Appendix F. As discussed in Step 2.2, FDS0 scenarios are not analyzed in the fire protection SDP as a risk contributor. Consequently, this issue screened as one of very low safety-significance (Green).

The inspectors did not identify a cross-cutting aspect associated with this finding because the finding was not representative of current performance.

Enforcement: License Condition 2.E requires the licensee to implement and maintain in effect all provisions of the approved fire protection program as described in the UFSAR and as approved through Safety Evaluation Reports dated November 1983 and its supplements. Section 9.5.1 of the UFSAR for Braidwood Station stated that the design bases, system descriptions, safety evaluation, inspection and testing requirements, personnel qualification, and training are described in the Fire Protection Report. The licensee stated in Section 3.6.c(7) of the Fire Protection Report that the foam suppression systems were installed in compliance with NFPA-16. Section 4.2.1 of NFPA-16-1980 required compliance with applicable requirements of various NFPA standards, including standard NFPA-13. Chapter 3 of the Fire Protection Report further stated that NFPA 13-1985 and NFPA 16-1980 were the standards of record for sprinkler and foam-water sprinkler systems, respectively. Obstruction requirements for sprinklers were included in NFPA-13-1985 as follows: Section 4-2.4.6 of NFPA-13-1985 specified that deflectors of sprinklers in bays shall be at sufficient distances from the beams, as shown in NFPA-13-1985 Table 4-2.4.6 and NFPA-13-1985 Figure 4-2.4.6, to avoid obstruction to the sprinkler discharge pattern. Table 4-2.4.6 of NFPA-13-1985 specified a maximum allowable distance above the bottom of the beam of zero inches for deflectors for sprinklers having a distance of less than one foot from beams. Section 4-4.11 of NFPA-13-1985 specified that sprinklers be installed underneath decks or galleries which are over four feet wide. Sections 4-2.4.6 and 4-4.11, Table 4-2.4.6, and Figure 4-2.4.6 of NFPA-13-1985 specified applicable requirements for NFPA-16 foam suppression systems.

Contrary to the above, from the time of original installation until March 19, 2009, the licensee failed to ensure that three foam sprinklers in the 2B diesel oil storage tank room were free of obstructions as required by NFPA-13-1985. In addition, the licensee failed to install a sprinkler under a deck or gallery over four feet wide. Specifically, the licensee located the three water-foam sprinklers less than 1 foot away from ventilation ducts with the deflectors located several inches above the bottom of the ventilation ducts. The configuration of the three sprinklers was similar to that of the beams discussed in Section 4-2.4.6 of NFPA-13-1985, in that the ventilation ducts provided obstructions similar to structural beams. In addition, the licensee failed to install a sprinkler under a 60 × 75 inch platform, which was a deck or a gallery, located in the northwest corner of the 2B diesel oil storage tank room. Because this violation was of very low safety-significance and it was entered into the licensee's corrective action program as IR 809865, this violation is being treated as NCV, consistent with Section VI.A.1 of the NRC Enforcement Policy **(NCV 05000457/2010002-04, Diesel Oil Storage Tank Room Sprinkler Obstructions)**.

.2 (Open) NRC TI 2515/177, "Managing Gas Accumulation in Emergency Core Cooling, Decay Heat Removal and Containment Spray Systems (NRC Generic Letter 2008-01)"

As documented in Sections 1R15 and 1R22, the inspectors confirmed the acceptability of the described licensee's actions. This inspection effort counts towards the completion of TI 2515/177, which will be closed in a later Inspection Report.

4OA6 Management Meetings

.1 Exit Meeting Summary

On April 6, 2010, the inspectors presented the inspection results to Mr. A. Shahkarami and other members of the licensee staff. The licensee acknowledged the issues presented. The inspectors confirmed that none of the potential report input discussed was considered proprietary. Proprietary material received during the inspection was returned to the licensee.

.2 Interim Exit Meetings

An Interim exit was conducted for:

- The results of the review of Unresolved Item 05000456/2009006-02; 05000457/2009006-02 involving diesel oil storage tank room sprinkler obstructions with Mr. M. Smith on March 5, 2010.

4OA7 Licensee-Identified Violations

The following violation of very low safety significance (Green) was identified by the licensee and is a violation of NRC requirements, which meets the criteria of Section VI of the NRC Enforcement Policy, NUREG-1600, for being dispositioned as an NCV.

- Title 10 CFR 50, Appendix B, Criterion V, "Instructions, Procedures, and Drawings," requires, in part, that activities affecting quality shall be accomplished in accordance with documented instructions, procedures or drawings. Contrary to the above, on July 1, 2009, the licensee failed to follow procedure

OP-AA-109-01, Attachment 8, Clearance Authorization Checklist, which requires all clearance order (C/O) tags be removed or accounted for. Specifically, carbon dioxide (CO_2) fire protection valve 2CO052C (Lower Cable Spreading Room Fire Zone 2S-45 Redundant EMPC Lockout Valve) was not restored to the required open position during removal of C/O 74741. There are two CO_2 discharge paths, main and redundant. With valve 2CO052C closed rather than open, the redundant CO_2 discharge path to fire zone 2S-45 was blocked. Automatic CO_2 discharge occurs through the main path and manual backup discharge can be actuated through the main or redundant paths. Therefore, with valve 2CO052C in the closed position the redundant manual discharge path was blocked, however, automatic and manual CO_2 discharge remained available through the main path.

The finding was more than minor due to impacting the Mitigating Systems Cornerstone objective to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. Because the inspectors assigned a low degradation rating to the issue, the finding screens as one of very low safety significance. The licensee entered this into their CAP as IR 1023743 and verified all other valves on C/O 74741 were in the correct position. In addition, the licensee initiated an Apparent Cause Evaluation to determine why the mispositioned valve was not discovered during prior opportunities.

ATTACHMENT: SUPPLEMENTAL INFORMATION

SUPPLEMENTAL INFORMATION

KEY POINTS OF CONTACT

Licensee

A. Shahkarami, Site Vice President
L. Coyle, Plant Manager
K. Aleshire, Emergency Preparedness Manager
L. Antos, Security Operations Manager
K. Appel, Corporate Emergency Preparedness Manager
G. Bal, Engineering Program Manager
L. Brooks, Shift Operations Supervisor
S. Butler, Emergency Preparedness Manager
B. Casey, Engineering Programs
P. Daley, Radiation Protection Manager
G. Dudek, Site Training Manager
D. Evans, Site Security Manager
R. Gadbois, Maintenance Manager
G. Galloway, Work Control Manager
R. Gaston, Regulatory Assurance Manager
G. Golwitzer, Plant Improvement Manager
D. Gullott, Regulatory Assurance Manager
J. Knight, Nuclear Oversight Manager
T. Mattson, NRC Coordinator
T. McCool, Operations Manager
J. Moser, Radiation Protection Manager
J. Odeen, Project Management Manager
D. Reidinger, Design Engineering Manager
T. Schuster, Chemistry Manager
J. Smith, Exelon Asset Manager
M. Smith, Engineering Manager
W. Smith, Operations Support Manager

Nuclear Regulatory Commission

R. Skokowski, Chief, Reactor Projects Branch 3

LIST OF ITEMS OPENED, CLOSED AND DISCUSSED

Opened

05000457/2010002-01	NCV	Failure to Correct a Condition Adverse to Quality (Section 1R15.2)
05000457/2010002-02	SL IV NCV	Failure to Perform a 10 CFR 50.59 Evaluation of a Temporary Modification to the 2B RVLIS Probe (Section 1R18.2)
05000456/2010002-03; 05000457/2010002-03	NCV	Performance of Troubleshooting Leads to Auxiliary Building Ventilation Fan Fire (Section 4OA3.4)
05000457/2010002-04	NCV	Diesel Oil Storage Tank Room Sprinkler Obstructions (Section 4OA5)

Closed

05000457/2010002-01	NCV	Failure to Identify a Condition Adverse to Quality (Section 1R15.2)
05000457/2010002-02	SL IV NCV	Failure to Perform a 10 CFR 50.59 Evaluation of a Temporary Modification to the 2B RVLIS Probe (Section 1R18.2)
05000456/2010002-03; 05000457/2010002-03	NCV	Performance of Troubleshooting Leads to Auxiliary Building Ventilation Fan Fire (Section 4OA3.3)
05000457/2010002-04	NCV	Diesel Oil Storage Tank Room Sprinkler Obstructions (Section 4OA5)
05000456/2009005-06; 05000457/2009005-06	URI	RCS RTD Cross-Calibration (Section 1R19.2)
05000456/2009006-02; 05000457/2009006-02	URI	Diesel Oil Storage Tank Room Sprinkler Obstructions (Section 4OA5)

Discussed

05000457/2009-003-00	LER	Drain Procedure for ECCS Suction Line Creates an Unanalyzed Condition Due to Inadequate Configuration (Section 4OA3.2)

LIST OF DOCUMENTS REVIEWED

The following is a list of documents reviewed during the inspection. Inclusion on this list does not imply that the NRC inspectors reviewed the documents in their entirety, but rather, that selected sections of portions of the documents were evaluated as part of the overall inspection effort. Inclusion of a document on this list does not imply NRC acceptance of the document or any part of it, unless this is stated in the body of the inspection report.

<u>1R04 Equipment Alignment</u>

- IR 1034349; The NRC Asked About the Protected Equipment for the 1B SI PP; February 23, 2010
- BwOP CS-E2; Electrical Lineup - Unit 2 Containment Spray System Electrical Lineup; Revision 0E2
- BwOP CS-M2; Operating Mechanical Lineup Unit 2; Revision 7
- BwOP RH-E1; Electrical Lineup - Unit 1 Operating; Revision 6
- BwOP RH-M1; Operating Mechanical Lineup Unit 1 1A RH Train; Revision 12
- BwOP SI-E1; Electrical Lineup - Unit 1 Operating; Revision 9
- BwOP SI-M1; Operating Mechanical Lineup Unit 1; Revision 20
- CS Injection Phase Actuation Logic/CS010 Monitor Light Relationship
- Drawing M-61; Diagram of Safety Injection Unit 1; Sheet 1A; May 4, 1985
- Drawing M-62; Diagram of Residual Heat Removal; May 5, 1976
- Clearance: 00081871; 1SI8811B Overhaul Actuator for MOV

<u>1R05 Fire Protection</u>

- Braidwood Fire Protection Report; December 2006; Amendment 22
- Byron/Braidwood fire Protection Report, December 2008; Amendment 23

<u>1R06 Flood Protection</u>

- IR 1022650; NOS ID: SX Room Temporary sump Pump Not in Accordance with Flood Calc Assumptions

<u>1R11 Licensed Operator Requalification Program</u>

- Braidwood OBE Scenario 1021; Revision 0; February 8, 2010

<u>1R12 Maintenance Effectiveness</u>

- BwMS 3150-039; VA Fan Preventive Maintenance Inspection; Revision 2
- ER-AA-310; Implementation of the Maintenance rule; Revision 8
- MA-AA-716-004; Conduct of Troubleshooting; Revision 9
- MA-AA-716-010 Maintenance Planning; Revision 15
- MA-AP-734-418; Joy Model 72-36-1770 VA Supply Fan Maintenance; Revision 3
- OP-AA-106-101-1006; 2CV8321A (2A Regenerative Heat Exchanger Packing Leak-off Line.; December 11, 2009
- CR 1014513 07; 0VA01CC Fan Bearing Failed; January 9, 2010
- IR 737793; Long-Standing VA Issues; February 3, 2008
- IR 739631; Need WR for Troubleshooter for Oil Usage, 0VA01CC; February 22, 2008
- IR 782567; VA Fans in Degraded Status; June 3, 2008

- IR 783866; Unit Common VA Fan Issues Identified; June 5, 2008
- IR 844665; VA Missed Surv-Results of VA Non-Access, PL. DP Measurements; November 10, 2008
- IR 862142; Alignment Between Pump/Motor Plan, Cycle Plan, and Budget; January 1, 2009
- IR 893828; Fan Still Needs to be Balanced; March 17, 2009
- IR 905045; Performance of TS Surveillance in Jeopardy (0VA01CC); April 9, 2009
- IR 914461; WO Removed from Clearance Order Prepared for 4/20 Week; May 1, 2009
- IR 922156; NOS ID - Issues Not Addressed for Summer Readiness; May 20, 2009
- IR 976927; Lack of Adherence to Commitment Date; October 9, 2009
- IR 1014513; Bad Bearing on 0VA01CC Causes Fire; January 9, 2010
- IR 1040066; Lack of Progress on 0VA01CC; March 8, 2010
- Scoping/Risk significance - Summary Report; Auxiliary Building HVAC; February 4, 2010
- Proposed Performance Criteria for Maintenance Rule Systems VA1; Ventilation to Auxiliary and Fuel Handling Buildings During Normal and Refueling Operations
- Proposed Performance Criteria for Maintenance Rule Systems VA2; Ventilation to Auxiliary and Fuel Handling Buildings During Accident Conditions
- Proposed Performance Criteria for Maintenance Rule Systems VA3; ESF Equipment Cubicle Temperatures for CV and RH
- Proposed Performance Criteria for Maintenance Rule Systems VA4; ESF Equipment Cubicle Temperatures for AF, CV and RH (CS, SFP, SI, & SX)
- Proposed Performance Criteria for Maintenance Rule Systems VA5; Ventilation for the Motor-Driven (Train A) AF Pumps
- System Performance Data 01/01/2008 through 12/31/2009; Auxiliary Building HVAC (VA) System
- VA-1, Aux Building Vent Schematics, October 5, 2009
- Reg Guide 1.26; Quality Group Classifications and Standards for Water, Steam, and Radioactive-Waste-Containing Components of NPPs; March 2007

1R13 Maintenance Risk Assessments and Emergent Work Control

- BRW-83645; Special Test on a Failed Vibration Sensor Cable - 1B ISO Phase Bus Duct, Manufacturer: CSI, Model No. A612-CC (Intact); March 11, 2010
- BwOP FW-13; Filling and Bleeding the FW Isolation Valve Hydraulic Actuators; Revision 17
- EC 353085; Evaluate Effect on FW009 Stroke Time When Replacing Hydraulic Flow Control Valve; December 28, 2004
- EC 378813; Continued Power Operations with FME Present in Unit 1 IsoPhase Bus Duct; February 8, 2010
- EC 378847; Engineering to Determine the PMT Requirements for 1FW009A Based on the Current Scope of Work and CO for WOs 682108 and 573504; February 11, 2010
- HU-AA-1211; Troubleshooting 1FW009A Hydraulic Pump Interlock Pressure Switch, Hydraulic Pump and Pump Motor; Revision 4
- IR 1022773; 1A FWIV Indicating Low Hydraulic Pressure - 1FW009A; January 28, 2010
- IR 1027431; Unit 1 Generator Ground Relay Trouble Alarm; February 8, 2010
- IR 1027485; 1MP01C, Vibration Cable Severed and Entered Bus Duct; February 8, 2010
- IR 1028011; OSHA Non-Compliance - Unguarded Rotating Equipment; February 9, 2010
- IR 1028131; FME Found in 2B Bus Duct cooling Fan Plenum; February 10, 2010
- IR 1032189; NRC Questions About 1FW009A Risk Assessment; February 17, 2010
- MA-AA-716-004; Verify/Place Hydraulic Pump Breaker ON at MCC 131X1, Compartment G2; Revision 9
- OP-AA-106-101-1006; Unit 1 IsoPhase Bus Duct (1MP05E); February 8, 2010

- WO 681208-01; Installation of Gooseneck Chuck/Throttle Valve Assembly in Support of the Troubleshooter
- 1FW009A On-Line Repair; February 16, 2010
- Braidwood Station Licensed Operator Requalification Simulator Scenario Guide; Bus Duct Cooling Fan Swap/Generator Trip/1CV121 Leakage/RCP Seal Failure; #JITT 10-1; February 16, 2010
- Unit 1 Bus Duct Project
- Prompt Investigation; 1A Bus Duct Cooling Fan, Cord that Connects Vibration Meter to Accelerometer was Sheared by Fan and Entered Bus Duct; February 8, 2010
- AC-7, AC One Line diagram; February 12, 2008; Revision 6

<u>1R15 Operability Evaluations</u>

- IR 626076; 1B DG Flow Low Alarm While Performing 1BwOSR 3.6.6.2; May 6, 2007
- IR 654702; 1A RH PP Flow Trending Measured @ 670 gpm; July 27, 2008
- IR 744695; 2B RH PP Min flow Trending @ 620 gpm per ASME; March 4, 2008
- IR 979957; 2A RH Pump IST Comprehensive Data Collection - 2RH01PA; October 15, 2009
- IR 995583; 2A RH PP Min Flow @ 664 gpm per ASME; August 20, 2009
- IR 995326; 2A RH PP Min Flow @ 662 gpm per ASME; November 11, 2009
- IR 1019552; Testing Demonstrated Degraded Components in 1CC9412B Starter; January 21, 2010
- IR 1024524; 1B DG SX Flow Question During 1BwOSR 3.6.6.2; February 1, 2010
- IR 1033885; 2A RH Pump Trending - 2RH01PA; February 10, 2010
- IR 1035124; NRC Identified Questions on IR for 2A RH Pump; February 24, 2010
- IR 1035448; PRA Risk Assessment Sheets Not Up-to-date - Schedule Impact; February 25, 2010
- IR 1035780; Increased Diametrical Clearance on 1SI01PB Outboard Bearing; February 25, 2010
- IR 1035784; LL: 1B SI Pump Drain Plan for CO Hang; February 22, 2010
- IR 1036003; NRC Resident Discussed 1B SI Shaft Issue with SM; February 26, 2010
- IR 1036004; NRC Question Related to 1SI01PB Bearing Clearance Resolution; February 26, 2010
- IR 1036076; 1SI8811B Extent of Condition for Medium Risk MOVs; February 26, 2010
- IR 1036118; Received Bus 214 Inverter Trouble Alarm While Starting RCFC; February 26, 2010
- IR 1036441; Request for Formal Op Eval from Engineering for 1CC9412B; February 27, 2010
- IR 1037788; G24
- Examination Results Performed on 1SI06BA and 1SI06BB; March 2, 2010
- Action Request 01008368; UT Examination Results Performed on 1SI06BA-24”; December 21, 2009
- EC 378795; 1B DG SX Flow Issue During Performance of 1BwOSR 3.6.6.2; Revision 000
- ECR 394304; Acceptability of Current Bearing Clearance for 1B SI Pump (1SI01PB)
- Generic Letter 2008-01; Managing Gas Accumulation in Emergency Core cooling, Decay Heat Removal, and Containment Spray Systems; January 11, 2008
- LS-AA-120; Issue Identification and Screening Process; Revision 11
- NEP-12-02.01; Diesel Generator Jacket Water Cooler Tube Plugging Evaluation; March 3, 2000
- OP-AA-108-115; MCC Control Circuit Components in 1AP23E-DV, Component Cooling to Train B RH Heat Exchanger Outlet Valve 1CC9412B; Revision 9
- SX01 Essential Service Water Schematic; May 11, 2009; Revision 15
- WO 01107731 01; 2FIX-0610 RHR Pump 2A Mini Flow Indicating Switch; August 17, 2009

- WO 01262460 01; IST for 2SI8959A - ASME SRV Requirements for 2RH01PA; November 11, 2009
- WO 01262727 01; 2FIS-0610 Cal Check/Optimization Prior to Next ASME; November 10, 2009
- WO 01287057 01; IST for 2SI8959A - ASME SRV Requirements for 2RH01PA; February 10, 2010 [NRC Identified]
- 2BwOSR 5.5.8.RH-5A; Group A IST Requirements for Residual Heat Removal Pump 2RH01PA; Revision 2
- Letter from Flowserve to Exelon; Pacific Model 3 JHF, 10-Stage SI Pump Applicable Serial Nos. 49762 and 49765 sectional Drawing AXS-49754; February 26, 2010

<u>1R18 Plant Modifications</u>

- IR 1029358; NRC Concern - Bumping Handle on Ball Valve 1AB040; February 5, 2010
- 1BwOSR 3.4.13.1; Quantification of 1CV121 Leakage; Revision 25
- EC 374828; Add Sightglass to 1CV121 Leak-Of Line 1ABF2A-1/2; January 21, 2010
- OP-AA-106-101-1006; 1CV Pack Leaking to 1AB03M; January 22, 2010
- TQ-AA-223-F070; Equipment Operator Training/Licensed Operator Requalification Training; January 22, 2010

<u>1R19 Post Maintenance Testing</u>

- IR 1034349; The NRC Asked About the Protected Equipment for the 1B SI PP; February 23, 2010
- IR 1035168; Shaft sleeve for 1SI 01PB Pump-CID#1441892 - Not Available; February 24, 2010
- IR 1035193; 1SI14AB Pipe Cap is Welded, Need Threaded Cap; February 24, 2010
- IR 1035839; 1TI-S1066 Found Damaged; February 26, 2010
- ANSI/IEEE Std 338-1987; IEEE Standard Criteria for the Periodic Surveillance Testing of Nuclear Power Generating Station Safety Systems; March 3, 1988
- CC-AA-103; Ability to Bypass Open Torque Switch for 1(2)SI8811a/B Isolation Valves; Revision 19
- CC-AA-309 Revision 0, Initial Issue; Tavg-T Channel Error Analysis 1&2T-0411, 0421, 0431, 0441; June 30, 1991
- CC-AA-309 Revision 1; August 15, 1991
- CC-AA-309 Revision 2; October 16, 1993
- CC-AA-309 Revision 3; October 22, 1993
- CC-AA-309 Revision 4; March 15, 1994
- CC-AA-309 Revision 5; May 5, 1995
- CC-AA-309 Revision 6; June 28, 1995
- CC-AA-309 Revision 7; September 17, 1998
- CC-AA-309 Revision 8; March 3, 2000
- CC-AA-309 Revision 9; June 16, 2000
- CC-AA-309 Revision 10; April 19, 2001
- CC-AA-309-1001; Evaluate Effects of Replacing Pressurizer Transmitters (2)1PT-0455, 0456, 0457, and 0458 for Braidwood from Barton 763 to Rosemount 1154; July 15, 2004
- CC-AA-309-1001 Revision 0; Channel Accuracy for PORV Setpoints and Wide Range RCS Temperature Indication (Unit 2); July 19, 2004
- CC-AA-309-1001 Revision 2; Channel Accuracy for PORV Setpoints and Wide Range RCS Temperature Indication (Unit 1); July 11, 2006

- EC 375521; NRA Scaling (2TY-0441B) for Replacement of RTD 2TE-0441B/2T#-0440B (Loop 2D RCS Cold Leg Temperature); Revision 000
- EC 378624; Torque Switch Bypass Circuit Mod for 1(2)SI8811A/B; Revision 00
- ER-AA-300 Motor-Operated Valve Program Administrative Procedure; Revision 6
- MA-AA-716-004; Attach Recorder to Control Panel on 0B VC Chiller, 0WO01CB; Revision 9
- MA-AA-723-300; Diagnostic Testing of Motor Operated Valves; Revision 3
- NES-G-14.01; Calculation No. NED-I-EIC-0014; April 14, 20011
- NRC IP 62708; Motor-Operated Valve Capability; September 12, 2000
- NUREG 0800; USNRC Standard Review Plan; Branch Technical Position 7-13, Guidance on Cross Calibration of Protection System Resistance Temperature Detectors; Revision 5, March 2007
- NUREG/CR-5560; RTD Cross Calibration
- NUREG/CR-5764 PNL-7594; Auxiliary Feedwater System Risk-Based Inspection Guide for the Ginna Nuclear Power Plant;
- OP-AA-106-101-1006; Determine Short Term Test Methodology Strategy For Calibration And Surveillance Testing Of Loops Coincident With 2T-0441, 2D DeltaT Loop Post A2R14, Based on August 27, 2008, April 24, 2009, August 26, 2009 Events And Work Performed During A2R14; October 28, 2009
- WO 1135844 01; Unit 2 Reactor Coolant System RTD Cross Calibration; October 31, 2009
- WO 1292919 01; IST for 1SI8919A/B/8922B/8926 0 ASME Surveillance Requirements for 2SI01PB; February 27, 2010
- WO 1318851 01; 1PA34J Control CAB Power Sup Trouble Alarm - 1PY-MS042D; March 22, 2010
- BwOP IC-9; Movable Incore Detector Operation; Revision 16
- BwOP VC-10; Startup of the Control Room Chilled Water System; Revision 27
- BwOP VC-11; Shutdown of the Control Room Chilled Water System; Revision 7
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- IE Bulletin 85-03; Motor-Operated Valve Common Mode Failures During Plant Transients due to Improper Switch Settings; November 15, 1985
- Generic Letter 89-10; Safety-Related (1) Motor-Operated Valve Testing and Surveillance; June 28, 1989
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- Regulatory Guide 1.118; Periodic Testing of Electric Power and Protection System; April 1995
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- Exelon Request for TS Amendment Re: Resistance Temperature Detector Bypass Elimination; February 21, 1995
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- Letter from NRR to Electric Power Research Institute; EPRI Topical Report 104965, On-Line Monitoring of Instrument Channel Performance, Final Report, November 1998; July 24, 2000

<u>1R22 Surveillance Testing</u>

- IR 927465; 3 Issues Identified on 1VD01CA Fan during DG Work Window; June 3, 2009
- BwOP DG-11; Diesel Generator Startup; Revision 37
- 1BwOSR 3.5.2.2; Unit One ECCS Venting and Valve Alignment Surveillance; Revision 24
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- WO 01240610 01; Measure Diesel Turbocharger Spin down Time; February 18, 2010
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- WO 01303621 01; IST-1B DG Operability Monthly; February 18, 2010

<u>1EP6 Drill Evaluation</u>

- Emergency Preparedness Drill Scenario for February 10, 2010 EP Drill
- IR 1028976; NOS ID Issues with Simulator ERO Drill Activities; February 11, 2010
- IR 1018998; Failed Demonstration Criteria in TSC - Priority Board; February 11, 2010
- IR 1019007; NOS ID TSC Issues for the TSC in ERO Drill; February 11, 2010
- IR 1019011; Failed Demonstration Criteria in TSC in Pre-Exercise - PM; February 11, 2010
- IR 1033036; ERO Documents Provide Conflicting Guidance; February 19, 2010
- IR 1034348; Simulator Exercise Management/Control Issues in Pre-Exercise; February 23, 2010
- IR 1014352; Facility/Equipment Issues in Simulator During Pre-Exercise; February 23, 2010
- IR 1034383; Failed Demonstration Criteria in OSC in Pre-Exercise; February 23, 2010
- IR 1035428; TSC Exercise Management/Facility/Equipment Issues from Pre-Exercise; February 25, 2010

<u>4OA1 Performance Indicator Verification</u>

- LS-AA-2010; Monthly Data Elements for NRC/WANO Unit/Reactor Shutdown Occurrences; January 2009 - December 2009
- LS-AA-2030; Monthly Data Elements for NRC Unplanned Power Changes per 7000 Critical Hours; January 2009 - December 2009
- LER 05000457/2009-001-00; Reactor Trip on Over Temperature Delta Temperature due to a Signal Spike on One Channel With Another Channel Placed in the Tripped Condition for Surveillance Testing, June 23, 2009
- LER 05000457/2009-002-00; Unit 2 Loss of Offsite Power Coincident with a Reactor Trip Due to Loss of 2C Reactor Coolant Pump, September 28, 2009

4OA2 Identification and Resolution of Problems

- IR 1029126; Unexplained Tritium in Water Puddles Near SI8811 Valves; February 11, 2010
- LS-AA-2010; Monthly Data Elements for NRC Unit 1 Reactor Shutdown Occurrences; Revision 5
- LS-AA-2030; Monthly Data Elements for NRC Unplanned PWR Changes Per 7000 Hours; Revision 5

4OA3 Event Follow-Up

- IR 925143; Unusual Light Indication at 1PM06J; May 28, 2009
- Letter From Exelon to NRC; Hot Leg Switchover Confirmatory Analysis Supporting Uprated Power Operations at Byron and Braidwood Stations; April 12, 2002
- Letter From NRC to Exelon; Hot Leg Switchover Confirmatory Analysis; September 27, 2002
- Drawing ECS-3, ECCS Notes; May 25, 2006; Revision 2
- Drawing ECCS-2, ECCS Ring; November 29, 2006; Revision 8
- Drawing ECCS-1, ECCS System; October 12, Revision 9
- PSA-B-98-08; Byron/Braidwood ECCS Flow Calculations for Safety Analysis; October 17, 2002
- 1BwEP-1; Loss of Reactor or Secondary coolant Unit 1; Revision 203
- BwOP SI-100; Energizing and De-Energizing SVAG Valve MCCS and SI Accumulator Outlet Valves in Modes One through Four; Revision 3
- NRC Even Notification Report; Loss of Control Power to ECCS Valves; May 28, 2009

4OA5 Other Activities

- IR 809865; NRC Issues with DOST Foam Sprinkler System Design; August 22, 2008
- Letter from Timothy A. Hawthorne, National Fire Protection Association, to Darrel Riedinger, Exelon Generation Company; June 2, 2009

LIST OF ACRONYMS USED

ADAMS	Agencywide Documents Access and Management System
AF	Auxiliary Feedwater
ANS	Alert and Notification System
ASME	American Society of Mechanical Engineers
C/O	Clearance Order
CAP	Corrective Action Program
CAQ	Condition Adverse to Quality
CC	Component Cooling
CFR	Code of Federal Regulations
CO_2	Carbon Dioxide
CS	Containment Spray
DG	Diesel Generator
DRP	Division of Reactor Projects
ECCS	Emergency Core Cooling System
EN	Event Notification
FME	Foreign Material Exclusion
FW	Main Feedwater
HVAC	Heating, Ventilation and Air
IIEEE	Institute of Electrical & Electronic Engineers
IEMA	Illinois Emergency Management Agency
IMC	Inspection Manual Chapter
IP	Inspection Procedure
IR	Inspection Report
IR	Issue Report
LER	Licensee Event Report
LLC	Limited Liability Corporation
MCC	Motor Controlled Center
MCR	Main Control Room
MOV	Motor Operated Valve
NCV	Non-Cited Violation
NEI	Nuclear Energy Institute
NFPA	National Fire Protection Association
NRC	U.S. Nuclear Regulatory Commission
NRR	Nuclear Reactor Regulation, Office of (NRC)
NUREG	Nuclear Regulatory Guide
PARS	Publicly Available Records
PI	Performance Indicator
PI&R	Problem Identification and Resolution
PMT	Post-Maintenance Testing
PORV	Power Operated Relief Valve
RCFC	Reactor Containment Fan Coolers
RCP	Reactor Coolant Pump
RCS	Reactor Coolant System
RH	Residual Heat Removal
RTD	Resistance Temperature Detector
RVLIS	Reactor Vessel Level Indication System
SAT	Station Auxiliary Transformer
SDP	Significance Determination Process
SI	Safety Injection

SPR	Sudden Pressure Relay
SSC	Structures, Systems, and Components
SX	Essential Service Water
TI	Temporary Instruction
TS	Technical Specification
UAT	Unit Auxiliary Transformer
UE	Notification of Unusual Event
UFSAR	Updated Final Safety Analysis Report
URI	Unresolved Item
UT	Ultrasonic Examination
VA	Auxiliary Building Ventilation
WO	Work Order
WR	Work Request

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Sincerely,

/RA/

Richard A. Skokowski, Chief
Branch 3
Division of Reactor Projects

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