



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

August 27, 2014

Mr. Michael J. Pacilio  
Senior VP, Exelon Generation Co., LLC  
President and CNO, Exelon Nuclear  
4300 Winfield Road  
Warrenville, IL 60555

SUBJECT: BRAIDWOOD STATION, UNITS 1 AND 2, BIENNIAL PROBLEM  
IDENTIFICATION AND RESOLUTION (PI&R) INSPECTION REPORT  
05000456/2014007; 05000457/2014007

Dear Mr. Pacilio:

On August 1, 2014, the U.S. Nuclear Regulatory Commission (NRC) completed a problem identification and resolution biennial inspection at your Braidwood Station, Units 1 and 2. The NRC inspection team discussed the inspection results at an interim exit meeting on August 1, 2014, with Ms. M. Marchionda and other members of your staff; and at the final exit meeting on August 7, 2014, with Mr. W. Spahr, and other members of your staff. The inspection team documented the results of this inspection in the enclosed inspection report.

Based on the inspection samples selected for review, the inspection team determined that your Braidwood Station staff's implementation of the corrective action program supported nuclear safety. In reviewing the corrective action program, the team assessed the Braidwood Station staff's ability to identify problems at a low threshold; to implement the station's process for prioritizing and evaluating these problems, and to implement effective corrective actions to resolve identified problems. In each of these areas, the team determined that performance was adequate to support nuclear safety.

The team also evaluated other processes your Braidwood Station staff used to identify issues for resolution. These included the use of audits and self-assessments to identify latent problems and incorporation of lessons learned from industry operating experience into station programs, processes, and procedures. The team determined that performance in each of these areas also supported nuclear safety.

Finally, based on the results of the interviews conducted, the inspection team did not identify any impediment to the establishment of a safety conscious work environment at Braidwood Station. Based on the inspection team's observations, employees expressed that they felt free to raise concerns related to nuclear safety without fear of retaliation.

The NRC inspectors did not identify any findings or violations of more than minor significance.

M. Pacilio

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In accordance with Title 10 of the *Code of Federal Regulations* (10 CFR) 2.390, "Public Inspections, Exemptions, Requests for Withholding," of the NRC's "Rules of Practice," a copy of this letter will be available electronically for public inspection in the NRC's Public Document Room or from the Publicly Available Records (PARS) component of the NRC's Agencywide Documents Access and Management System (ADAMS). ADAMS is accessible from the NRC Web site at <http://www.nrc.gov/reading-rm/adams.html> (the Public Electronic Reading Room).

Sincerely,

**/RA/**

Eric R. Duncan, Chief  
Branch 3  
Division of Reactor Projects

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

Enclosure:  
IR 05000456/2014007; 05000457/2014007  
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: 05000456/2014007; 05000457/2014007

Licensee: Exelon Generation Company, LLC

Facility: Braidwood Station, Units 1 and 2

Location: Braceville, IL

Dates: July 21 through August 1, 2014

Inspectors: J. Lennartz, Project Engineer  
J. Benjamin, Senior Resident Inspector  
C. Brown, Reactor Engineer  
R. Winter, Reactor Engineer  
M. Perry, Resident Inspector  
Illinois Emergency Management Agency

Approved by: E. Duncan, Chief  
Branch 3  
Division of Reactor Projects

Enclosure

## **SUMMARY OF FINDINGS**

Inspection Report 05000456/2014007; 05000457/2014007; 07/21/2014–08/01/2014; Braidwood Station, Units 1 and 2; Biennial Problem Identification and Resolution (PI&R) Inspection.

This inspection was performed by three NRC region-based inspectors, the Braidwood Senior Resident Inspector, and the Braidwood Illinois Emergency Management Agency (IEMA) Resident Inspector. No findings of significance or violations of NRC requirements were identified during this inspection. 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.

### **Problem Identification and Resolution**

On the basis of the samples selected for review, the inspection team concluded that the corrective action program (CAP) at Braidwood Station was generally being implemented in an effective manner. Licensee personnel had a low threshold for identifying problems and entering them into the CAP. Issues entered into the CAP were found to be screened and prioritized in a timely manner using established criteria; were found to be properly evaluated commensurate with their safety significance; and corrective actions were found to be generally implemented in a timely manner, commensurate with their safety significance. The inspection team noted that the Braidwood Station staff reviewed operating experience (OE) for applicability to station activities and that, in general, OE was effectively utilized. Audits and self-assessments were generally thorough and intrusive and performed at an appropriate level to identify deficiencies. Based on the interviews conducted during the inspection, the inspectors did not identify any impediment to the establishment of a safety conscious work environment (SCWE) at Braidwood Station. Workers at the site expressed freedom to raise concerns related to nuclear safety without fear of retaliation, and workers were aware of and generally familiar with the CAP process and other processes, including the Employee Concerns Program (ECP), which could be used to raise safety concerns.

### **NRC-Identified and Self-Revealed Findings**

None.

### **Licensee-Identified Violations**

None.

## **REPORT DETAILS**

### **4. OTHER ACTIVITIES**

#### **4OA2 Problem Identification and Resolution (71152B)**

This inspection constituted one biennial sample of PI&R as defined in Inspection Procedure 71152, "Problem Identification and Resolution." Documents reviewed are listed in the Attachment to this report.

##### **.1 Corrective Action Program Effectiveness**

###### **a. Inspection Scope**

The inspector reviewed the licensee's CAP implementing procedures and interviewed licensee personnel to assess CAP implementation. The inspectors also observed and assessed the effectiveness of CAP-related meetings, which included the station ownership committee meeting and the management screening committee meeting.

The inspectors reviewed risk-significant and safety-significant issue reports (IRs) entered into the licensee's CAP since the last NRC PI&R inspection in June 2012. The IRs reviewed included a sampling of issues identified through NRC generic communications, licensee audits and self-assessments, operating experience reports, NRC documented findings, and licensee-identified violations. The inspectors also reviewed IRs for selected systems, structures, and components or functions classified as (a)(1) status in accordance with the maintenance rule (10 CFR 50.65). The IRs selected ensured an adequate review across NRC cornerstones and included completed root cause and apparent cause evaluations.

Based on input from the resident staff, the inspectors selected the auxiliary feedwater and essential service water systems for in-depth reviews of system performance over the past 5 years. These in-depth reviews were conducted to determine whether the licensee was properly evaluating and taking appropriate corrective actions for the problems documented in IRs related to these systems.

During these reviews, the inspectors determined whether licensee actions were in compliance with the CAP implementing procedures and 10 CFR Part 50, Appendix B requirements. Specifically, the inspectors assessed whether licensee personnel identified issues at a proper threshold, whether identified issues were being entered into the CAP in a timely manner with the appropriate significance characterization, and whether identified issues were appropriately prioritized for resolution. The inspectors determined whether licensee personnel assigned the appropriate evaluation method to ensure that the correct root, apparent, and contributing causes were determined; verified that issues were appropriately evaluated with respect to the maintenance rule and operability; and assessed the evaluation's scope and depth. The inspectors also evaluated the timeliness and effectiveness of corrective actions. For significant conditions adverse to quality, the inspectors assessed the corrective actions to prevent recurrence. For less significant issues, the inspectors verified that the corrective actions were implemented in a timely manner commensurate with their safety significance.

b. Assessment

(1) Effectiveness of Problem Identification

Based on the results of the inspection, the inspectors concluded that problem identification was generally effective. Based on the information reviewed, the inspectors determined that Braidwood Station personnel had a low threshold for initiating IRs; station personnel appropriately screened issues from both the NRC and industry operating experience at an appropriate level and entered them into the CAP when applicable; and identified problems were generally entered into the CAP in a complete, accurate, and timely manner.

Findings

No findings were identified.

(2) Effectiveness of Prioritization and Evaluation of Issues

Based on the results of the inspection, the inspectors concluded that identified problems were generally prioritized and evaluated commensurate with their safety significance, including an appropriate consideration of risk. Higher level evaluations, such as root cause and apparent cause evaluations were generally technically accurate; of sufficient depth to effectively identify the cause(s); and adequately considered extent of condition, generic implications, and previous occurrences.

The inspectors determined that the station ownership committee and management review committee meetings were generally thorough and meeting participants were actively engaged and well-prepared. Station ownership committee and management review committee meetings accurately prioritized issues.

The inspectors determined that overall, Braidwood Station personnel evaluated equipment operability and functionality requirements adequately after a degraded or non-conforming condition was identified, and appropriate actions were assigned to correct the degraded or non-conforming condition.

Findings

No findings were identified.

(3) Effectiveness of Corrective Actions

Based on the results of the inspection, overall, the corrective actions reviewed were found to be appropriately focused to correct the identified problem and were implemented in a timely manner commensurate with the issue's safety significance. Problems identified through root or apparent cause evaluations were resolved in accordance with the CAP procedural and regulatory requirements. Corrective actions intended to prevent recurrence were generally comprehensive, thorough, and timely.

The corrective actions associated with selected NRC documented findings and violations, as well as licensee-identified violations, were generally appropriate to correct the problem and were implemented in a timely manner. However, the inspectors

identified one unresolved item, as discussed below, concerning the corrective actions to address a degraded Unit 2 reactor coolant pump (RCP) thermal barrier.

### Findings

Introduction: The inspectors identified an Unresolved Item (URI) regarding the incorporation of Westinghouse Nuclear Safety Advisory Letter (NSAL) 99-05, "Reactor Coolant Pump Operation During Loss of Seal Injection," into the current licensing basis (CLB). Specifically, Westinghouse issued NSAL 99-05 to inform plants with specific model Westinghouse RCPs that during a postulated loss of RCP seal injection, RCP seal package and/or lower bearing temperatures may rise more rapidly than previously assumed in the original design. The previous analysis assumed that an RCP could operate without seal injection for a relatively long period of time (e.g., 24 hours or longer) because the thermal barrier heat exchanger (TBHX) could provide adequate seal cooling if seal injection was lost. Westinghouse NSAL 99-05 notified licensees that this assumption may no longer be correct if RCP seal leakoff was less than 2.5 gallons per minute (gpm).

Description: In 1999, Westinghouse notified Braidwood Station through NSAL 99-05, "Reactor Coolant Pump Operation During Loss of Seal Injection," of a potential safety issue that had not been previously identified as part of the original design. Specifically, the NSAL described concerns that during a postulated loss of seal injection (LOSI) event, the RCP seal package and/or lower bearing temperatures may rise more rapidly than previously assumed in the original design. The original design considered the thermal barrier and associated heat exchanger as a fully functional backup to seal injection during a LOSI event. Consequently, following a loss of seal injection, the RCP thermal barrier and associated TBHX would cool the reactor coolant fluid that would flow up the RCP shaft and through the seals to maintain the lower bearing and the RCP seal temperatures within their normal temperature range for an extended period of time (i.e., 24 hours).

The NSAL notified the licensee of a non-conformance to this original design. Specifically, during a postulated LOSI for RCPs with less than 2.5 gpm seal leakoff rate, it was determined that the RCP TBHX system would not be capable of maintaining the RCP seals within their nominal temperature range for the previously assumed extended period of time. Instead, the NSAL concluded that the RCP seal temperatures would rise above acceptable operating temperatures within 1 to 2 hours if the RCP had less than a 2.5 gpm seal leakoff rate. With low seal leakoff rates, even though the reactor coolant system (RCS) water is cooled in the TBHX, the water will be heated after it flows through the TBHX. Westinghouse postulated that there may not be enough mass flow up along the shaft to absorb the heat transferred from the RCS, potentially raising the seal and bearing temperatures above their operating limits. In addition to NSAL 99-05 applicability to all Braidwood RCPs, the Braidwood Unit 2, 2B RCP TBHX system was particularly adversely affected since the 2B RCP thermal barrier had also been identified to have degraded insulating properties. The licensee estimated that for a bounding set of plant conditions, Operations personnel would have approximately 27 minutes to respond after losing seal injection before the 2B RCP trip criteria would be reached. This condition had existed since 1999 and as of the end of the inspection the licensee had not taken any action to correct the degraded thermal barrier.

The inspectors discussed the potential consequences that a LOSI event may have on the 2B RCP after reaching the RCP trip criteria. One consequence would be the need for operators to insert a manual reactor trip prior to the manual 2B RCP pump trip in accordance with plant procedures, training, and associated expectations. Also, the licensee informed the inspectors that the event was bounded by the total loss of RCP seal cooling analysis that concluded 21 gpm of controlled leakage could occur.

The licensee entered the original NSAL 99-05 operating experience issue into their CAP in 1999 and determined that the Updated Final Safety Analysis Report (UFSAR) was not required to be updated. Additionally, during the inspection the licensee affirmed that the decision to not update the UFSAR was correct because the UFSAR was still correct and the level of detail in NSAL 99-05 was not required to be discussed in the UFSAR. Although a loss of RCP seal injection and/or RCP TBHX function was discussed in numerous instances in the UFSAR, the following excerpt in the UFSAR generally described the CLB discussed in other UFSAR sections. (REF: original Safety Analysis Report (SAR) and UFSAR Section 5.4.1.2).

*High-Pressure seal injection water is introduced through a connection on the thermal barrier flange. A portion of this water flows through the radial bearing and the seals; the remainder flows down the shaft through the thermal barrier where it acts as a buffer to prevent system water from entering the radial bearing and seal section of the unit. The thermal barrier heat exchanger provides a means of cooling system water to an acceptable level in the event seal injection flow is lost.*

The licensee informed the inspectors that the UFSAR was still correct because the RCP would be tripped upon reaching the pre-established temperature limits upon a LOSI event and that the worst case leakage through each RCP would be 21 gpm for a total of 84 gpm from the four RCPs. This amount of controlled leakage was within the capacity of a single high head injection charging pump. However, the inspectors questioned this response because the conditions described in NSAL 99-05 had not been identified during the time frame that the original SAR was approved. Consequently the inspectors questioned whether or not the assumptions in the original SAR that established an acceptable level of safety and the licensing basis for the RCP TBHX system were adversely affected.

Additionally, Westinghouse NSAL 99-05 recommended that all plants review their SAR relative to the loss of seal injection and ensure that the SAR was consistent with the NSAL, indicating a limited time frame for operation without seal injection (Ref: Westinghouse NSAL 99-05, Recommended Actions #1).

At the conclusion of the inspection, a detailed review of the CLB was in progress. This URI will remain open until that review is completed and the inspectors determine whether NSAL 99-05 was adequately incorporated into the Braidwood CLB and whether the licensee should have implemented additional corrective actions to address the degraded 2B RCP thermal barrier.

**(URI 05000456/2014007-01; 05000457/2014007-01; Incorporation of Westinghouse NSAL 99-05, "Reactor Coolant Pump Operation During Loss of Seal Injection," Into the Current Licensing Basis and Corrective Actions For 2B RCP Degraded Thermal Barrier)**



## .2 Use of Operating Experience

### a. Inspection Scope

The inspectors reviewed the licensee's OE program implementation. Specifically, the inspectors reviewed OE program implementing procedures, attended CAP meetings to observe the screening of OE information, reviewed completed evaluations of OE issues and events, and reviewed selected monthly assessments of the OE composite performance indicators. The inspectors performed this review to determine whether the licensee was effectively integrating OE into the performance of daily activities, whether evaluations of issues were proper and conducted by qualified personnel, whether the licensee's program was sufficient to prevent future occurrences of previous industry events, and to determine whether NRC-identified and industry-identified OE were entered into the licensee's OE system as prescribed by procedure and were properly evaluated for significance. The inspectors also assessed if corrective actions resulting from OE were identified and implemented in an effective and timely manner.

### b. Assessment

Based on the results of the inspection, the inspectors did not identify any issues of concern regarding Braidwood Station's use of OE and concluded that, in general, OE was effectively utilized at the station. Industry OE was effectively disseminated across the various plant departments and the inspectors did not identify any issues while reviewing OE evaluations. The inspectors also verified that the use of OE in formal CAP products such as root cause evaluations and equipment apparent cause evaluations was appropriate and adequately considered. Generally, OE that was applicable to Braidwood Station was thoroughly evaluated and actions were implemented in a timely manner to address any issues that resulted from the evaluations.

### Findings

No findings were identified.

## .3 Self-Assessments and Audits

### a. Inspection Scope

The inspectors reviewed selected self-assessments, including adverse trend assessments and performance assurance audits to assess the licensee staff's ability to identify and enter issues into the CAP with the appropriate characterization, to prioritize and evaluate issues commensurate with their safety significance, and to implement effective corrective actions in a timely manner. The inspectors also evaluated whether self-assessments and audits were effectively managed and adequately covered the subject areas and verified that assessments were conducted in accordance with plant procedures, including procedure LS-AA-126-1005, "Self-Assessment Program."

### b. Assessment

Based on the results of the inspection, the inspectors did not identify any issues of concern regarding Braidwood Station staff's ability to conduct self-assessments and audits. Assessments were conducted in accordance with plant procedures, were generally thorough and intrusive, adequately covered the subject area, and were

effective at identifying issues and enhancement opportunities at an appropriate threshold. Identified issues were entered into the CAP with an appropriate significance characterization and corrective actions were completed and/or scheduled to be completed in a timely manner commensurate with their safety significance.

#### Findings

No findings were identified.

### .4 Safety Conscious Work Environment

#### a. Inspection Scope

The inspectors assessed the licensee's SCWE by reviewing the licensee's ECP implementing procedures; through discussions with the ECP coordinators; by reviewing IRs; and by conducting interviews with licensee personnel from various departments on site including Operations, Maintenance, Security, Radiation Protection and Chemistry. The inspectors also reviewed the results from a 2013 mid-cycle safety culture survey that was conducted in November 2013. The review was performed to ensure there was a free flow of information and to determine if individuals were willing to raise nuclear safety concerns without fear of retaliation.

#### b. Assessment

Based on the results of the inspection, the inspectors did not identify any issues that suggested conditions were not conducive to the establishment and existence of a SCWE at Braidwood Station.

Information obtained during the interviews indicated that an environment was established where Braidwood Station employees felt free to raise nuclear safety issues without fear of retaliation; were aware of and generally familiar with the CAP and other processes, including the ECP and the NRC, through which concerns could be raised; and safety significant issues could be freely communicated to supervision.

#### Findings

No findings were identified.

### 4OA5 Other Activities

#### (Closed) Notice of Violation 05000456/2012004-03; 05000457/2012004-03 Failure to Analyze Recycle Holdup Tank Inlet Piping Loads

A non-cited violation (NCV) of Title 10 CFR 50, Appendix B, Criterion III, "Design Control," was issued in February 2009, when licensee personnel failed to evaluate the effect of dynamic loads on inlet piping from Unit 1 and Unit 2 residual heat removal system suction relief valves that discharged to the recycle holdup tank (RHUT); and as a result, failed to verify if the RHUT design was adequate to withstand loads resulting from a discharge through residual heat removal system suction relief valves into the RHUT. However, during a subsequent inspection, the NRC inspectors determined that the licensee had not restored compliance for this NCV within a time period commensurate with the significance of the issue. Consequently, the conditions for considering the

violation as non-cited, in accordance with Section 2.3.2(a)(2) of the NRC Enforcement Policy, were not met. Therefore, a cited Notice of Violation was issued on November 8, 2012.

The licensee responded to the NRC regarding this Notice of Violation by letter dated December 7, 2012, which described corrective actions and when full compliance would be achieved. The licensee's corrective actions included: 1) revising procedures to assure adequate quench volume was present whenever the RHUT was aligned to the residual heat removal system suction relief valves; 2) evaluating calculation analysis CN-CRA-09-29 to determine whether dynamic loads from potential over-pressurization were within the design limit of the RHUT provided the RHUT had an adequate volume of colder water to lower the temperature effect from the hotter residual heat removal system water; 3) evaluating calculation analysis BRW 10-0010 to assure acceptable large early release frequency dose conditions existed; and, 4) performing modifications to protect against separate water hammer concerns by providing adequate drain and venting capability and adequate structural support for the inlet piping. The inspectors reviewed the licensee's written response and relevant documents to evaluate the adequacy of corrective actions and to verify that the corrective actions were completed. The inspectors did not identify any issues of concern. Full compliance was achieved on May 30, 2014. This violation is closed.

#### 4OA6 Management Meetings

##### .1 Interim Exit Meeting Summary

On August 1, 2014, the inspectors presented the preliminary inspection results to Ms. M. Marchionda, Braidwood Plant Manager, 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.

##### .2 Exit Meeting Summary

On August 7, 2014, the inspectors conducted a teleconference exit meeting to present the final inspection results to Mr. W. Spahr, Braidwood Maintenance Director, 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.

ATTACHMENT: SUPPLEMENTAL INFORMATION

## KEY POINTS OF CONTACT

### Licensee

M. Marchionda, Plant Manager  
J. Bashor, Engineering Director  
W. Spahr, Maintenance Director  
T. Fisk, Nuclear Oversight  
D. Jewell, Maintenance Corrective Action Program Coordinator  
E. Johnston, Operations Corrective Action Program Coordinator  
M. Morris, Radiation Protection Corrective Action Program Coordinator  
D. Poi, Emergency Preparedness Manager  
P. Raush, Regulatory Assurance Manager  
A. Ronstadt, Engineering Corrective Action Program Coordinator  
C. Tate, Corrective Action Program Manager  
M. Abbas, NRC Coordinator  
J. Zoeller, Nuclear Oversight

### Nuclear Regulatory Commission

D. Betancourt, Resident Inspector  
E. Duncan, Branch Chief, Division of Reactor Projects

## LIST OF ITEMS OPENED, CLOSED AND DISCUSSED

### Opened

05000456/2014007-01; 05000457/2014007-01	URI	Incorporation of Westinghouse NSAL 99-05, "Reactor Coolant Pump Operation During Loss of Seal Injection," Into the Current Licensing Basis and Corrective Actions For 2B RCP Degraded Thermal Barrier
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### Closed

05000456/2012004-03; 05000457/2012004-03	VIO	Failure to Analyze Recycle Holdup Tank (RHUT) Inlet Piping Loads
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### Discussed

None

## 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 or 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.

### Issue Reports

- IR 173517; AF Voided Section of SX to AF Piping—AF Pump Suction; February 10, 2011
- IR 1176071; NRC Question Regarding OP Eval of Aux Feed Pump Suction; February 16, 2011
- IR 1194196; 2A AF Pump Suction Void; March 29, 2011
- IR 1193357; NRC Questions on AF Suction Void Op Eval 11-003; March 28, 2011
- IR 1195979; CALC VA-102 Does Not Clearly Account for AFW Diesel Exhaust; April 1, 2011
- IR 1681031; NOS ID: NSRB Manager Top 3 Concerns—RP; July 11, 2014
- IR 1202772; NRC Questions On Auxiliary Feedwater Pump Suction Piping; April 14, 2011
- IR 1265614; Flow Circulation Issue of 1SX04P During Loss of All AC Scenario; September 20, 2011
- IR 1403298; NRC Questions Regarding CST Assumptions; August 22, 2012
- IR 1542417; CDBI—Revise CALC BRW-03-0122-M, Rev. 01—1CD01T; August 1, 2013
- IR 1473781; NOS ID: Adverse Trend in Lab Ventilation Availability; February 11, 2013
- IR 1489784; Misunderstanding Regarding IR Generation In Chemistry; March 19, 2013
- IR 1512327; Raw Water FASA 1473720 Deficiency; May 9, 2013
- IR 1682767; NOS ID: Repeat Deficiency in Chemistry Electronic Log Usage; July 16, 2014
- IR 1508409; NOS ID: Inadequate Contamination Control Practices in FHB; April 30, 2013
- IR 1492167; Gamma Isotopic Review Procedure Needs Improving; March 25, 2013
- IR 1582905; TSC Monitor Room/Outside DP Reading Off Scale High; November 8, 2013
- IR 1467237; Online Risk Status Inappropriately Changed to Green; January 24, 2013
- IR 1601995; EP ANS Siren Failure BWD; December 30, 2013
- IR 1586957; EP ANS Siren Failures BWD; November 18, 2013
- IR 1536279; IR 01535556 Was a Missed Opportunity; July 15, 2013
- IR 1569690; Braidwood PI Drill OSC Demonstration Criteria Failures; December 13, 2013
- IR 1388785; No 50.59 Evaluations on 11 Scaffolds in Shaw Scaffold Log; July 14, 2012
- IR 1401502; OVH12C Control Switch Found in Incorrect Position; August 8, 2012
- IR 1402491; Reactor Trip Breaker Declared Inoperable; August 21, 2012
- IR 1417077; Charger 211 Trips When Selected to Equalize; September 23, 2012
- IR 1426821; Fuse and Fuse Holder Broke during Removal; October 15, 2012
- IR 1428336; TMI Fencing Was Not Left in Correct Configuration; October 18, 2012
- IR 1452558; Byron NRC CDBI – Document Lack of Formal Analysis; December 14, 2012
- IR 1463348; Electrical Wiring Exposed; January 16, 2013
- IR 1493170; PZR Operability Criterion in BWARS Needs Revision; March 27, 2013
- IR 1493532; Metal Detector Would Not Alarm During Testing; March 28, 2013
- IR 1506857; 2BWOA RCP-1 Entry Due to RCP 2B Seal Leakoff Low Flow; April 26, 2013
- IR 1532020; Boric Acid Buildup and Leak – 2CV057; July, 3, 2013
- IR 1534438; Ground Washing Away by Fence Post in OCA; July 11, 2013
- IR 1535550; 1B DG Fuel Oil Cooler Leaking Jacket Water at 2 Drops/Second; July 15, 2013
- IR 1536268; Cracked Ballistic Window in November Post; July 16, 2013
- IR 1543151; Gage Reading Out of Spec for Rounds – 1PI-OG085; August 4, 2013
- IR 1550372; DC Bus 111 84V Positive Ground, 1BWO5 DDC-1A Entry; August 25, 2013

- IR 1552045; Trend Identified in MCR Low Pressure Alarm Issues; August 29, 2013
- IR 1556141; Air Leak from Piping Upstream of 1SA166A; September 10, 2013
- IR 1558186; U-2 Power Range N-43 Instrument Fuse Degraded; September 13, 2013
- IR 1566096; Bollards Won't Raise; October 1, 2013
- IR 1573114; 1E Travelling Screen Did Not Rotate; October 17, 2013
- IR 1575076; Debris Floating in DC Battery 112, Cell 50; October 22, 2013
- IR 1578220; Fuse Holder Degraded – 2AP15E (233Y); October 29, 2013
- IR 1580847; Need Setpoint Changes; November 4, 2013
- IR 1582521; Pressure Indicator Not Showing Proper Indication; November 7, 2013
- IR 1601853; Security System Problems During Morning Rush; December 30, 2013
- IR 1644236; Security Bollards Will Not Lower as Expected; April 4, 2014
- IR 1680031; CCP Abandoned Valve Should Be Re-Labeled; July 8, 2014
- IR 1447642; A1R17 Need Maintenance top Support Mech. Snubber Re-Greasing; December 4, 2012
- IR 1451846; MA-MW-792-041 Crimper Procedure Needs Revising; December 13, 2012
- IR 1459387; Trend-Config Control with Maintenance; January 7, 2013
- IR 1506481; WO Needed to Inspect U1 RWST Leak Detection Lines; April 25, 2013
- IR 1516417; Power Range Channel Dev Alarm; May 2, 2013
- IR 1528263; M&TE Selection Sheet Needs Updating; June 24, 2013
- IR 1588832; Maintenance Department Does Not Have Anyone 50.59 Qualified; November 22, 2013
- IR 1462948; Assignment 42; WC-AA-120 – Track Issuance of Rev 02; January 15, 2013
- IR 1459403; Adverse Trend: Work Packages Not Ready for E-6 Walkdowns; January 7, 2013
- IR 1580489; Trend: Crew Clock Resets for Maintenance Planning; November 11, 2013
- IR 01442306, 3Q2012 – NRC LIV – Repeat Scaffold Exceeding 90-Days
- IR 1459403; Adverse Trend: Work Packages Not Ready for E-6 Walkdowns; January 7, 2013
- IR 1580489; Trend: Crew Clock Resets for Maintenance Planning; November 11, 2013
- IR 1653228; VC Maintenance Rule (a)(1) Determination; April 29, 2014
- IR 1553206; Sporadic Main Control Room Pressure Low Alarms – 0PDI-VC038D; September 1, 2013
- IR 1538889; VC System Maintenance Rule (a)(1) Determination; July 23, 2013
- IR 1469711; Trend in NRFF & CCFS; January 31, 2013
- IR 1534296; DOST/SX Check Valves in Maintenance Rule; July 10, 2013
- IR 1503635; 2PR18J Communication Failure; April 18, 2013
- IR 1650084; 2PR18J Loss of Communications; April 21, 2013
- IR 1386277; NOED for UHS TS 3.7.9 for Temperature Approved; July 7, 2013
- IR 1393616; Maintenance Rule SX1 Criteria Exceeded; July 26, 2013
- IR 1646212; Diesel Driven Fire Pump Trip; April 11, 2014
- IR 1459013; Control Power Light Not On for 0FP05J; January 5, 2013
- IR 1459387; Trend Config Control With Maintenance; January 7, 2013
- IR 1498897; Review 1/2WF040A/B Valves For Inclusion Into MRULE; April 8, 2013
- IR 1551487; 2Q13 - NRC Green NCV – MR Scope For SX + DOST Check Valves; August 28, 2013
- IR 1415958; Emergency Response Equipment Not Being Repaired Timely; September 20, 2012
- IR 0575935; 2SX011 As-Found Torque Data Exceeds As-Found Test Criteria; January 5, 2007
- IR 1021127; 1B SX Strainer Cover Sealing Surfaces Degraded – 1SX01FB; January 25, 2010
- IR 1206114; 2B SX Pump Leak Detection Sump will Not Trip Alarm; April 22, 2011
- IR 1296854; NRC ID: Potential Incomplete Guidance in BwOS SX-1; December 1, 2011
- IR 1393616; Maintenance Rule SX1 Criteria Exceeded; July 26, 2012

- IR 1430575; 2A DG Jacket Water Cooler SX Leak; June 23, 2012
- IR 1542372; SX Piping Leak – 1SX27DA; August 1, 2013
- IR 1613789; 4Q13 – NRC Green LIV – 1A SX Return Line to DG – LER; January 28, 2014

#### Root Cause Evaluations

- IR 1194196; 2A AF Pump Suction Void; March 29, 2011
- IR 1226235; Temporary Hose Rupture Wets Vital Equipment; June 8, 2011
- IR 1218756; EC 384507 For Past Inoperability of the 2A AF Train; May 21, 2011
- IR 1373856; Historical Missed Technical Requirements Manual (TRM) 3.3.p Action Due to Inoperable Fuel Handling Incident Area Radiation Monitors (1/2RE-AR011/12); Revision 3; July 13, 2012
- IR 1549690; Decline in Braidwood Operations Performance Results in Three Human Performance Errors; Revision 2; October 4, 2013
- IR 1459387; Assignment 2; Adverse Trend in Maintenance Configuration Control Performance Due to Maintenance Supervisors Not Consistently Enforcing Configuration Control Standards; January 7, 2013
- IR 1530596; 2B RCP#2 Seal Leakoff Screens as Moderate Aggregate Burden Resulting in Maintenance Outage A2M05; June 29, 2013
- IR 1585421; Engineering Review Performed Without Appropriate Certification Guide Completed; December 30, 2013

#### Apparent Cause Evaluations

- IR 1545807; Rollup IR for Calcium Scaling; March 29, 2011
- IR 1620872; NOS Finding: Inadequate Controls for Atmospheric Hazards; February 13, 2014
- IR 1503707; BWD EP Off Year Exercise TSC Failed Objectives; April 18, 2013
- IR 1402941; 1B Reactor Trip Breaker Failed to Re-Close During Surveillance; August 21, 2012
- IR 1430575; 2A Diesel Generator (DG) Jacket Water Leak; October 23, 2012
- IR 1432386; Essential Service (SX) Water Spraying from the 2A Diesel Generator Jacket Water Cooler and Drain Hose During Return to Service; October 28, 2012
- IR 1388785; No 50.59 Evaluation on 11 Scaffolds in Shaw Scaffold Log; July 14, 2012
- IR 1403947; Unexpected Cylinder Head Replacement for 2A DG; March 12, 2012
- IR 1597817; Scaffold Exceeds 90 Day Teardown Requirement; December 16, 2013
- IR 1649515; Incorrect Stop Pushbutton Installed on 0B Fire Pump; April 19, 2014
- IR 1585270; A Fire Protection Surveillance Was Credited to an Incorrect Date; November 8, 2013
- IR 1569533; Crew 4 Fire Brigade Performance Did Not Meet Expectations Per OP-AA-201-003; October 8, 2013
- IR 1601971; 1B Essential Service Water Pump Oil Leak from the Bearing Housing; December 8, 2013

#### Operating Experience (OPEX) Program

- OPEX 00012372; Westinghouse NSAL 99-005 – RCP Operation During Loss of Seal Injection; June 1, 1999
- OPEX 01473594; Review Part 21 2013-01-00 10 CFR 50.55 from Watts Bar; February 11, 2013
- OPEX 01480110; Review Part 21 – GE Hitachi – NRC 2012-42-02; February 26, 2013
- OPEX 01681183; Part 21 Review 2014-38-00, Part 21 – Watts Bar – Fuses; July 12, 2014

### Maintenance Rule

- EACE 1596932-02; Various Hydramotor Failures; 2013
- System Health Report; VC - Main Control Room HVAC; 2<sup>nd</sup> Quarter 2014
- M-96; Diagram of Control Room HVAC System; Revision AD
- ER-AA-310-1005, Attachment 3 Template; (a)(1) Action Plan for Control Room Ventilation Emergency Makeup Units, Train A and B; October 18, 2013
- Maintenance Rule System Basis Document; System WE; 2014
- Maintenance Rule System Basis Document; System WF; 2014
- Maintenance Rule System Basis Document; System OD; 2014
- Maintenance Rule System Basis Document; System PL; 2014

### Miscellaneous

- EC 396488; Revise Calculation VA-100 and VA-102 As Necessary See IR 119597; December 31, 2013
- ECR 415459; Install Spot Cooler For Chem Lab MR90; July 17, 2014
- WO 1714125; 0VL02A Remove/Replace Cooling Coil
- WO 1463033; Technical Support Center Vent Sys HEPA Filter Test; December 9, 2011
- WO 1498973; Technical Support Center Vent Sys HEPA Filter Test; December 31, 2013
- Braidwood Oct/Nov PI Drill 2013 Evaluation Report;
- Braidwood Assembly & Accountability Drill Report; October 30, 2013
- 2013 Mid-Cycle Safety Culture Survey
- Learning Program Indicators for June 2014
- NSAL-99-005 ; Reactor Coolant Pump Operation During Loss of Seal Injection; June 1 1999
- Quality Assurance Topical Report NO-AA-10; Revision 88
- WCAP-16396-NP; Westinghouse Owners Group Reactor Coolant Pump Seal Performance for Appendix R Assessments; Revision 0
- System Health Report; Fire Protection; 2<sup>nd</sup> Quarter
- Calculation 2.4.6-BRW-14-0069-S; Structural Evaluation of the Flanged Connection of the SX Discharge Piping at the Cooling Lake; Revision 0
- Letter BW120120; Braidwood Response to NCV 05000456/2012004-03; 05000457/2012004-03; December 7, 2012
- CN-CRA-09-29; Byron/Braidwood Response to Opening of the RHR Relief Valve; Revision 0
- BRW-10-0010-M; Byron/Braidwood Doses Due to Recycle Holdup Tank Failure; Revision 0
- Initial License Training; Reactor Coolant Pump; Revision 5a
- License Amendment Request; AEP, Donald C. Cook Nuclear Units 1 and 2, Reactor Coolant Pump Seal Leak-Off Two-Phase Flow: Revised Analysis and Related Changes; September 26, 2000

### Issue Reports Generated As a Result of the NRC Inspection

- IR 1683029; NRC Questions Regarding 2B RCP Thermal Barrier Function; July 17, 2014
- IR 1685783; IEMA Question on Op Eval 11-003; July 25, 2014
- IR 1688929; PI&R Inspection NRC Observation (EP); August 1, 2104
- IR 1688955; PI&R Lack of Rigor & Attention to Detail in WO 01498973-01; August 4, 2014

### Audits, Assessments and Self-Assessments

- IR 1659532; 2014 NRC PI&R FASA—2Q11 Finding for Air in AFW System; May 13, 2014
- IR 1593630; Chemistry INPO Midcycle Gap-U1 & U2 RCS TSS Results Erratic;



- December 6, 2013
- IR 1591632; Rad Haz Assess & Exposure Control NRC Inspec (IP 71124.01);
- December 1, 2013
- IR 1591636; Rad Monitoring Instrumentation NRC Inspec (IP 71124.05); December 1, 2013
  - IR 1591658; Check-In Self-Assessment—Contamination Control; December 1, 2013
  - IR 1591660; Check-In Self-Assessment—Radioactive Source Control; December 1, 2013
  - IR 1319374; Benchmark Vacuum Filtration System For S/G; January 28, 2012
  - IR 1451259; Benchmark PWR ALARA Assoc 2/15-7/13 Industry Excellence;
- December 12, 2013
- IR 1317505; Check-In Self-Assessment REMP; January 24, 2012
  - IR 1317535; Check-In Self-Assessment for ISO 14001; January 24, 2012
  - IR 1317538; Check-In Self-Assessment Green House Gases and Air; January 24, 2012
  - IR 1611669; Benchmark Chemistry Culture & Site Perception; January 23, 2014
  - IR 1675966; Missed Performance Indicator Opportunity During PI Drill; June 11, 2014
  - IR 1675971; Missed Performance Indicator Opportunity During PI Drill; June 25, 2014
  - IR 1510165; Failed ERO Assembly and Accountability Objective; June 3, 2013
  - IR 1519983; EP Not Notified of ERO Team Member Long Term Absence; May 28, 2013
  - IR 1426970; Incorrect EP NRC ROP Data Reported in August 2012; October 15, 2012
  - IR 1443091; June 2012 DEP PI Numbers Were Not Accurate; November 21, 2012
  - IR 1300327; Charcoal Filter Gaskets Not Seated Properly; December 9, 2011
  - IR 1300313; Gaskets Not Sealing Properly; December 8, 2011
  - IR 1445955; Annual Review of Level # OPEX Evaluations; March 27, 2013
  - IR 1606441; Bi-annual OPEX Program Check In; January 24, 2014
  - IR 1606441; Braidwood Station OPEX Program 2013 Biennial Assessment; March 31, 2014
  - FASA 1502705; Fleet OPEX Program 2013 Biennial Assessment; December 20, 2013
  - 2013 Maintenance Rule Program – Check-in Self-Assessment
  - IR 1290585; Preventative Maintenance; November 15, 2001
  - IR 1414373; Maintenance Planning Work Package Quality – Check-in; September 17, 2012
  - IR 1419618; Check-in Deficiency:E-20 Schedule Resource Loading; September 18, 2012
  - IR 1448169; Clearance and Tagging Annual Assessment; December 5, 2012
  - IR 1453978; Pre-Job Briefing Deficiency; December 18, 2012
  - IR 1464298; Work Package Quality; January 18, 2013
  - IR 1464433; A1R17 FME Assessment; January 18, 2013
  - IR 1464449; Thermography; January 18, 2013
  - IR 1473660; Braidwood Maintenance and Test Equipment Process; February 11, 2013
  - IR 1477422; Deficiencies Identified During Maintenance Check-in FASA; February 19, 2013
  - IR 1524455; Check-in Deficiency – Priority Emergent Work; June 13, 2013
  - IR 1530116; Maintenance Rule Scoping; June 28, 2013
  - IR 1538687; In-Storage Maintenance; July 23, 2013
  - IR 1551417; 2014 Refrigeration Check-in Recommendation; August 28, 2013
  - IR 1555005; Deficiency Identified during Maintenance Department Check-in;
- September 6, 2013
- IR 1567925; Maintenance Planning; October 4, 2013
  - IR 1611883; Inspection of Media in Records Management QA Vault; January 24, 2014
  - IR 1614891; Fluid Leak Management; January 30, 2014
  - IR 1649993; Expired Staging/Work Area Sign; April 21, 2014
  - IR 1523722; Deficiency #1 from Braidwood M&TE Check-in #1473660; June 10, 2013
  - IR 1458025; Check-In Assessment on Issue Report (IR) Generation; January 3, 2013
  - IR 1462800; Check-In Assessment on Configuration Change Quality Annual Assignment;
- February 26, 2013
- IR 1530116; Check-In Assessment on Maintenance Program Rule Scoping; July 19, 2013

## Plant Procedures

- LS-AA-126; Self-Assessment and Benchmark (SAB) Program; Revision 7
- CY-AP-130-927; RCS Hydrogen/Total Gas; Revision 5
- CY-AA-130-3000; Gamma Isotopic Review; Revision 4
- CY-AA-130-3000; Gamma Isotopic Review; Revision 0
- PI-AA-120; Issue Identification and Screening Process; Revision 0
- PI-AA-125; Corrective Action Program Procedure; Revision 0
- LS-AA-115; Operating Experience Program; Revision 18
- LS-AA-115-1001; Processing Level 1 OPEX Evaluations; Revision 7
- LS-AA-115-1002; Processing of Level 2 OPEX Evaluations; Revision 5
- LS-AA-115-1003; Processing Level 3 OPEX Evaluations; Revision 3
- LS-AA-115-1004; Processing of NERs, ICES, OEs, and Root Cause Report Transmittals to INPO; Revision 3
- LS-AA 115-1001; Attachment 3, Level 1 and Historical SOER Effectiveness Assessment; Revision 7
- LS-AA-126-1001; Focused Area Self-Assessment; Revision 7
- LS-AA-126-1005; Self-Assessment Program; Revision 5
- PI-AA-125-1001; Root Cause Analysis Manual; Revision 0
- PI-AA-125-1003; Apparent Cause Evaluation Manual; Revision 1
- PI-AA-125-1004; Effectiveness Review Manual; Revision 0
- PI-AA-125-1006; Investigation Techniques Manual; Revision 0
- BwIS VV-1; TSC Ventilation System HEPA & Charcoal Filter Performance Test; Revision 1
- OP-AA-201-003; Fire Drill Performance; Revision 13
- BWOP FC-M2; Operating Mechanical Lineup Fuel Pool Cooling Unit 2; Revision 7
- BwHP 4006-072; ITT Hydramotor Actuator NH95 Disassembly, Inspection and Assembly; Revision 1E1
- BwHP 4006-073; ITT Hydramotor Actuator NH-91 Disassembly, Inspection and Assembly; Revision 1E1
- BwHP 4006-101; NH91 Nuclear Hydramotor Actuator; Revision 0
- BwHP 4006-103; NH95 Nuclear Hydramotor Actuator; Revision 0
- 2BwOA RCP-2; Loss of Seal Cooling Unit 2; Revision 101
- 1BwOA PRI-15; Loss of Normal Charging Unit 1; Revision 1

## **LIST OF ACRONYMS USED**

ADAMS	Agencywide Documents Access and Management System
CAP	Corrective Action Program
CLB	Current Licensing Basis
ECP	Employee Concerns Program
gpm	gallons per minute
IEMA	Illinois Emergency Management Agency
IR	Issue Report
LOSI	Loss of Seal Injection
NCV	Non-Cited Violation
NRC	Nuclear Regulatory Commission
NSAL	Nuclear Safety Advisory Letter
OE	Operating Experience
PARS	Publicly Available Records System
PI&R	Problem Identification and Resolution
RCP	Reactor Coolant Pump
RCS	Reactor Coolant System
RHUT	Recycle Holdup Tank
SAR	Safety Analysis Report
SCWE	Safety Conscious Work Environment
TBHX	Thermal Barrier Heat Exchanger
UFSAR	Updated Final Safety Analysis Report
URI	Unresolved Item

M. Pacilio

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Sincerely,

**/RA/**

Eric R. Duncan, Chief  
Branch 3  
Division of Reactor Projects

Docket Nos. 50-456; 50-457  
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