



**UNITED STATES  
NUCLEAR REGULATORY COMMISSION**

REGION III  
2443 WARRENVILLE ROAD, SUITE 210  
LISLE, IL 60532-4352

September 24, 2012

Mr. Michael J. Pacilio  
Senior Vice President, Exelon Generation Company, LLC  
President and Chief Nuclear Officer, Exelon Nuclear  
4300 Winfield Road  
Warrenville, IL 60555

SUBJECT: BRAIDWOOD STATION, UNITS 1 AND 2  
TRIENNIAL FIRE PROTECTION INSPECTION REPORT  
05000456/2012008; 05000457/2012008 AND NOTICE OF VIOLATION

Dear Mr. Pacilio:

On September 7, 2012, the U.S. Nuclear Regulatory Commission (NRC) completed a Triennial Fire Protection Inspection at your Braidwood Station, Units 1 and 2. The enclosed inspection report documents the inspection results, which were discussed on August 24, 2012, with Mr. D. Enright, and on September 7, 2012, with Ms. A. Ferko, 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.

The NRC has identified two findings of very low safety significance (Green) during this inspection. One of these findings was determined to involve a violation of NRC requirements and is cited in the enclosed Notice of Violation (Notice) and the circumstances surrounding this violation are described in detail in the enclosed report. Although determined to be of very low safety significance (Green), this violation is being cited in the Notice because you failed to restore compliance within a reasonable time after the violation was identified in NRC Inspection Report 05000456/2010002; 05000457/2010002, per Section 2.3.2 of the NRC Enforcement Policy. The current Enforcement Policy is accessible from the NRC website at <http://www.nrc.gov/about-nrc/regulatory/enforcement/enforce-pol.html>.

You are required to respond to this letter and should follow the instructions specified in the enclosed Notice when preparing your response. If you have additional information that you believe the NRC should consider you may provide it in your response to the Notice. The NRC will use your response, in part, to determine whether further enforcement action is necessary to ensure compliance with regulatory requirements.

If you contest the subject or severity of the violation you should provide a response within 30 days of the date of this inspection report, with the basis for your denial, to the U.S. Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington DC 20555-0001; with a copy to the Regional Administrator, U.S. Nuclear Regulatory Commission – Region III,

M. Pacilio

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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 NRC Resident Inspector office at the Braidwood Station. In addition, if you disagree with the cross-cutting aspect assigned to 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 the Braidwood Station.

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

Sincerely,

/RA/

Steven A. Reynolds, Director  
Division of Reactor Safety

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

Enclosure: Inspection Report 05000456/2012008;  
05000457/2012008 and Notice of Violation  
w/Attachment: Supplemental Information

cc w/encl: Distribution via ListServ™

## NOTICE OF VIOLATION

Exelon Generation Company, LLC  
Braidwood Station, Unit 1 and 2

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

During a U. S. Nuclear Regulatory Commission's (NRC) inspection conducted from July 25 through September 7, 2012, a violation of NRC requirements was identified. In accordance with the NRC Enforcement Policy, the violation is listed below:

License Condition 2.E required, in part, the licensee to implement and maintain in effect all provisions of the approved Fire Protection Program as described in the Updated Final Safety Analysis Report (UFSAR). 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. Section 2.3.10.2 of the Fire Protection Report stated that the primary extinguishing system for the Unit 2 2B diesel oil storage tank room was a manual protein foam-water system. Section 3.6.c(7) of the Fire Protection Report stated that the foam suppression systems were installed in compliance with National Fire Protection Association (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-water suppression systems.

Contrary to the above, from the time of original installation until September 7, 2012, the licensee failed to implement and maintain in effect all provisions of the approved Fire Protection Program by failing to ensure that two 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 two sprinklers less than one foot away from ventilation ducts with the deflectors located several inches above the bottom of the ventilation ducts. The configuration of the two 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 on the west side of the 2B diesel oil storage tank room.

This violation is associated with a Green Significance Determination Process finding.

Pursuant to the provisions of 10 CFR 2.201, Exelon Generation Company, LLC is hereby required to submit a written statement or explanation to the U.S. Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, DC 20555-0001 with a copy to the Regional Administrator, Region III, and a copy to the NRC Resident Inspector at the Braidwood Station, within 30 days of the date of the letter transmitting this Notice of Violation (Notice). This reply should be clearly marked as a "Reply to a Notice of Violation" and should include: (1) the reason for the violation, or, if contested, the basis for disputing the violation; (2) the corrective steps that have been taken and the results achieved; (3) the corrective steps that will be taken; and (4) the date when full compliance will be achieved. Your response may reference or include previous docketed correspondence, if the correspondence adequately addresses the required response. If an adequate reply is not received within the time specified in this Notice, an Order or a Demand for Information may be issued as to why the license should not be modified, suspended, or revoked, or why such other action as may be proper should not be taken. Where good cause is shown, consideration will be given to extending the response time.

If you contest this enforcement action, you should also provide a copy of your response, with the basis for your denial, to the Director, Office of Enforcement, United States Nuclear Regulatory Commission, Washington, DC 20555-0001.

Because your response will be made available electronically for public inspection in the NRC Public Document Room or from the NRC's document system (ADAMS), accessible from the NRC Web site at <http://www.nrc.gov/reading-rm/adams.html>, to the extent possible, it should not include any personal privacy, proprietary, or safeguards information so that it can be made available to the public without redaction. If personal privacy or proprietary information is necessary to provide an acceptable response, then please provide a bracketed copy of your response that identifies the information that should be protected and a redacted copy of your response that deletes such information. If you request withholding of such material, you must specifically identify the portions of your response that you seek to have withheld and provide in detail the bases for your claim of withholding (e.g., explain why the disclosure of information will create an unwarranted invasion of personal privacy or provide the information required by 10 CFR 2.390(b) to support a request for withholding confidential commercial or financial information).

Dated this 24 day of September 2012.

U. S. NUCLEAR REGULATORY COMMISSION

REGION III

Docket No: 50-456; 50-457

License No: NPF-72; NPF-77

Report No: 05000456/2012008; 05000457/2012008(DRS)

Licensee: Exelon Generation Company, LLC

Facility: Braidwood Station, Units 1 and 2

Location: Braceville, IL

Dates: July 25 through September 7, 2012

Inspectors: Dariusz Szwarc, Reactor Inspector, Lead  
Benny Jose, Senior Reactor Inspector  
Ronald Langstaff, Senior Reactor Inspector

Approved by: Robert C. Daley, Chief  
Engineering Branch 3  
Division of Reactor Safety

Enclosure

## SUMMARY

IR 05000456/2012008, 05000457/2012008; 07/25/2012 – 09/07/2012; Braidwood Station, Units 1 and 2; Routine Triennial Fire Protection Baseline Inspection.

This report covers an announced Triennial Fire Protection Baseline Inspection. The inspection was conducted by Region III inspectors. Two findings were identified by the inspectors. One of the findings was considered a violation (VIO) 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 0310, "Components Within the Cross-Cutting Areas." 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 inspectors identified a finding of very low safety significance associated with cited violation of License Condition 2.E for the licensee's failure to implement the approved Fire Protection Program by failing to install foam-water sprinklers in accordance with the standard for installing sprinklers. Specifically, the licensee failed to correct significant obstructions to foam-water sprinklers in the Unit 2 2B diesel oil storage tank room that were previously identified by the NRC in a Non-Cited Violation in May 2010. The licensee entered this issue into their corrective action program and planned to survey each of the four diesel oil storage tank rooms for obstructions to determine the scope of physical changes needed to bring each room into compliance with the standard for installing sprinklers. The licensee will address corrective actions as part of their response to the Notice of Violation.

The inspectors determined that the finding was more than minor because the significant obstructions to foam-water sprinklers in the 2B diesel oil storage tank room could adversely affect the application of foam or water suppressant in the event of a fire. The finding was of very low safety significance because 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. This finding had a cross-cutting aspect in the area of Problem Identification and Resolution, Corrective Action Program because the issue had been previously identified by the NRC and the resolution did not address the cause of the issue, (i.e., the physical installation). [P.1(c)] (Section 4AO2b)

- Green. The inspectors identified a finding of very low safety significance for the licensee's failure to properly address fire brigade drill performance deficiencies identified after completion of an unannounced fire drill. Specifically, the licensee failed to address the need to wait for the fire brigade leader's determination that it was safe to use elevators. The licensee entered this issue into their corrective action program and generated training requests to reinforce the proper use of elevators by the fire brigade.

The inspectors determined that the finding was more than minor because the finding, if left uncorrected, would become a more significant safety concern. Specifically, the

improper use of elevators by the fire brigade during a fire could impact the ability of the brigade to fight a fire as smoke, heat, or flames could affect fire brigade members upon opening of elevator doors on the fire floor. The finding was of very low safety significance because the simulated fire was successfully suppressed by individuals who did not use the elevator. This finding had a cross-cutting aspect in the area of Human Performance, Work Practices because the licensee did not enforce expectations on not proceeding in the face of uncertainty or unexpected conditions. [H.4(a)] (Section 4AO5b)

**B. Licensee-Identified Violations**

No violations of significance were identified.

## REPORT DETAILS

### 1. REACTOR SAFETY

#### **Cornerstones: Initiating Events and Mitigating Systems**

##### 1R05 Fire Protection (71111.05T)

The purpose of the Fire Protection Triennial Baseline Inspection was to conduct a design-based, plant specific, risk-informed, onsite inspection of the licensee's fire protection program's defense-in-depth elements used to mitigate the consequences of a fire. The fire protection program shall extend the concept of defense-in-depth to fire protection in plant areas important to safety by:

- preventing fires from starting;
- rapidly detecting, controlling and extinguishing fires that do occur;
- providing protection for structures, systems, and components important to safety so that a fire that is not promptly extinguished by fire suppression activities will not prevent the safe shutdown of the reactor plant; and
- taking reasonable actions to mitigate postulated events that could potentially cause loss of large areas of power reactor facilities due to explosions or fires.

The inspectors' evaluation focused on the design, operational status, and material condition of the reactor plant's fire protection program, post-fire safe shutdown systems, and B.5.b mitigating strategies. The objectives of the inspection were to assess whether the licensee had implemented a Fire Protection Program that: (1) provided adequate controls for combustibles and ignition sources inside the plant; (2) provided adequate fire detection and suppression capability; (3) maintained passive fire protection features in good material condition; (4) established adequate compensatory measures for out-of-service, degraded or inoperable fire protection equipment, systems or features; (5) ensured that procedures, equipment, fire barriers and systems exist so that the post-fire capability to safely shutdown the plant was ensured; (6) included feasible and reliable operator manual actions when appropriate to achieve safe shutdown; and (7) identified fire protection issues at an appropriate threshold and ensured these issues were entered into the licensee's problem identification and resolution program.

In addition, the inspectors' review and assessment focused on the licensee's post-fire safe shutdown systems for selected risk significant fire areas. Inspector emphasis was placed on determining that the post-fire safe shutdown capability and the fire protection features were maintained free of fire damage to ensure that at least one post-fire safe shutdown success path was available. The inspectors' review and assessment also focused on the licensee's B.5.b related license conditions and the requirements of Title 10, Code of Federal Regulations (10 CFR) Part 50.54 (hh)(2). Inspector emphasis was to ensure that the licensee could maintain or restore core cooling, containment, and spent fuel pool cooling capabilities utilizing the B.5.b mitigating strategies following a loss of large areas of power reactor facilities due to explosions or fires. Documents reviewed are listed in the Attachment to this report.



The fire zones and B.5.b mitigating strategies selected for review during this inspection are listed below and in Section 1R05.13. The fire zones selected constituted five inspection samples and the B.5.b mitigating strategies selected constituted two inspection samples, respectively, as defined in Inspection Procedure 71111.05T.

| Fire Zone | Description  |
|-----------|--|
| 3.1-1     | Unit 1 Cable Tunnel                                  |
| 5.5-2     | Unit 2 Auxiliary Electrical Equipment Room           |
| 9.2-1     | Diesel Generator 1A Room                             |
| 9.3-1     | Diesel Generator 1A Day Tank Room                    |
| 11.2-0    | Auxiliary Building, General Area, 346 Foot Elevation |

.2 Protection of Safe Shutdown Capabilities

a. Inspection Scope

For each of the selected fire areas, the inspectors reviewed the fire hazards analysis, safe shutdown analysis, and supporting drawings and documentation to verify that safe shutdown capabilities were properly protected.

The inspectors also reviewed the licensee’s design control procedures to ensure that the process included appropriate reviews and controls to assess plant changes for any potential adverse impact on the fire protection program and/or post-fire safe shutdown analysis and procedures.

b. Findings

No findings of significance were identified.

.3 Passive Fire Protection

a. Inspection Scope

For the selected fire areas, the inspectors evaluated the adequacy of fire area barriers, penetration seals, fire doors, electrical raceway fire barriers, and fire rated electrical cables. The inspectors observed the material condition and configuration of the installed barriers, seals, doors, and cables. The inspectors reviewed approved construction details and supporting fire tests. In addition, the inspectors reviewed license documentation, such as NRC safety evaluation reports, and deviations from NRC regulations and the National Fire Protection Association (NFPA) standards to verify that fire protection features met license commitments.

The inspectors walked down accessible portions of the selected fire areas to observe material condition and the adequacy of design of fire area boundaries (including walls, fire doors, and fire dampers) to ensure they were appropriate for the fire hazards in the area.

The inspectors reviewed the installation, repair, and qualification records for a sample of penetration seals to ensure the fill material was of the appropriate fire rating and that the installation met the engineering design.

b. Findings

No findings of significance were identified.

.4 Active Fire Protection

a. Inspection Scope

For the selected fire areas, the inspectors evaluated the adequacy of fire suppression and detection systems. The inspectors observed the material condition and configuration of the installed fire detection and suppression systems. The inspectors reviewed design documents and supporting calculations. In addition, the inspectors reviewed license basis documentation, such as NRC safety evaluation reports, deviations from NRC regulations, and NFPA standards to verify that fire suppression and detection systems met license commitments.

b. Findings

No findings of significance were identified.

.5 Protection from Damage from Fire Suppression Activities

a. Inspection Scope

For the selected fire areas, the inspectors verified that redundant trains of systems required for hot shutdown would not be subject to damage from fire suppression activities or from the rupture or inadvertent operation of fire suppression systems including the effects of flooding. The inspectors conducted walkdowns of each of the selected fire areas to assess conditions, such as the adequacy and condition of floor drains, equipment elevations, and spray protection.

b. Findings

No findings of significance were identified.

.6 Alternative Shutdown Capability

a. Inspection Scope

The inspectors reviewed the licensee's systems required to achieve alternative safe shutdown to determine if the licensee had properly identified the components and systems necessary to achieve and maintain safe shutdown conditions. The inspectors also focused on the adequacy of the systems to perform reactor pressure control, reactivity control, reactor coolant makeup, decay heat removal, process monitoring, and support system functions.

The inspectors conducted selected area walkdowns to determine if operators could reasonably be expected to perform the alternate safe shutdown procedure actions and that equipment labeling was consistent with the alternate safe shutdown procedure.

The review also looked at operator training, as well as consistency between the operations shutdown procedures and any associated administrative controls.

b. Findings

No findings of significance were identified

.7 Circuit Analyses

a. Inspection Scope

The inspectors verified that the licensee performed a post-fire safe shutdown analysis for the selected fire areas and the analysis appropriately identified the structures, systems, and components important to achieving and maintaining safe shutdown. Additionally, the inspectors verified that the licensee's analysis ensured that necessary electrical circuits were properly protected and that circuits that could adversely impact safe shutdown due to hot shorts, shorts to ground, or other failures were identified, evaluated, and dispositioned to ensure spurious actuations would not prevent safe shutdown.

The inspectors' review considered fire and cable attributes, potential undesirable consequences, and common power supply/bus concerns. Specific items included the credibility of the fire threat, cable insulation attributes, cable failure modes, and actuations resulting in flow diversion or loss of coolant events.

The inspectors also reviewed cable raceway drawings for a sample of components required for post-fire safe shutdown to verify that cables were routed as described in the cable routing matrices.

The inspectors reviewed circuit breaker coordination studies to ensure equipment needed to conduct post-fire safe shutdown activities would not be impacted due to a lack of coordination. Additionally, the inspectors reviewed a sample of circuit breaker maintenance records to verify that circuit breakers for components required for post-fire safe shutdown were properly maintained in accordance with procedural requirements.

The inspectors verified for cables that are important to safe shutdown but not part of the success path, and that do not meet the separation/protection requirements of Section III.G.2 of 10 CFR Part 50, Appendix R, that the circuit analysis considered the cable failure modes. In addition, the inspectors have verified that the licensee has either: (1) determined that there is not a credible fire scenario (through fire modeling); (2) implemented feasible and reliable manual actions to assure SSD capability; or (3) performed a circuit fault analysis demonstrating no potential impact on SSD capability exists.

b. Findings

No findings of significance were identified.

.8 Communications

a. Inspection Scope

The inspectors reviewed, on a sample basis, the adequacy of the communication system to support plant personnel in the performance of alternative safe shutdown functions and fire brigade duties. The inspectors verified that plant telephones, page systems, sound powered phones, and radios were available for use and maintained in working order. The inspectors reviewed the electrical power supplies and cable routing for these systems to verify that either the telephones or the radios would remain functional following a fire.

b. Findings

No findings of significance were identified.

.9 Emergency Lighting

a. Inspection Scope

The inspectors performed a plant walkdown of selected areas in which a sample of operator actions would be performed in the performance of alternative safe shutdown functions. As part of the walkdowns, the inspectors focused on the existence of sufficient emergency lighting for access and egress to areas and for performing necessary equipment operations. The locations and positioning of the emergency lights were observed during the walkdown and during review of manual actions implemented for the selected fire areas.

b. Findings

No findings of significance were identified.

.10 Cold Shutdown Repairs

a. Inspection Scope

The inspectors reviewed the licensee's procedures to determine whether repairs were required to achieve cold shutdown and to verify that dedicated repair procedures, equipment, and material to accomplish those repairs were available onsite. The inspectors also evaluated whether cold shutdown could be achieved within the required time using the licensee's procedures and repair methods. The inspectors also verified that equipment necessary to perform cold shutdown repairs was available onsite and properly staged.

b. Findings

No findings of significance were identified.

.11 Compensatory Measures

a. Inspection Scope

The inspectors conducted a review to verify that compensatory measures were in place for out-of-service, degraded or inoperable fire protection and post-fire safe shutdown equipment, systems, or features (e.g., detection and suppression systems, and equipment, passive fire barriers, pumps, valves or electrical devices providing safe shutdown functions or capabilities). The inspectors also conducted a review of the adequacy of short term compensatory measures to compensate for a degraded function or feature until appropriate corrective actions were taken.

b. Findings

No findings of significance were identified.

.12 Review and Documentation of Fire Protection Program Changes

a. Inspection Scope

The inspectors reviewed changes to the approved fire protection program to verify that the changes did not constitute an adverse effect on the ability to safely shutdown. The inspectors also reviewed the licensee's design control procedures to ensure that the process included appropriate reviews and controls to assess plant changes for any potential adverse impact on the fire protection program and/or post-fire safe shutdown analysis and procedures.

b. Findings

No findings of significance were identified.

.13 Control of Transient Combustibles and Ignition Sources

a. Inspection Scope

The inspectors reviewed the licensee's procedures and programs for the control of ignition sources and transient combustibles to assess their effectiveness in preventing fires and in controlling combustible loading within limits established in the fire hazards analysis. The inspectors performed plant walkdowns to verify that transient combustibles and ignition sources were being implemented in accordance with the administrative controls.

b. Findings

No findings of significance were identified.

.14 B.5.b Inspection Activities

a. Inspection Scope

The inspectors reviewed the licensee's preparedness to handle large fires or explosions by reviewing selected mitigating strategies. This review ensured that the licensee

continued to meet the requirements of their B.5.b related license conditions and 10 CFR 50.54(hh)(2) by determining that:

- Procedures were being maintained and adequate;
- Equipment was properly staged, maintained, and tested;
- Station personnel were knowledgeable and could implement the procedures; and
- Additionally, inspectors reviewed the storage, maintenance, and testing of B.5.b related equipment.

The inspectors reviewed the licensee’s B.5.b related license conditions and evaluated selected mitigating strategies to ensure they remain feasible in light of operator training, maintenance/testing of necessary equipment and any plant modifications. In addition, the inspectors reviewed previous inspection reports for commitments made by the licensee to correct deficiencies identified during performance of Temporary Instruction (TI) 2515/171 or subsequent performances of these inspections.

The B.5.b mitigating strategies selected for review during this inspection are listed below. The offsite and onsite communications, notifications/emergency response organization activation, initial operational response actions and damage assessment activities identified in Table A.3 1 of Nuclear Energy Institute (NEI) 06-12, “B.5.b Phase II and III Submittal Guidance,” Revision 2 are evaluated each time due to the mitigation strategies’ scenario selected.

|   |  |
|---|--|
| <b>NEI 06-12,<br/>Revision 2,<br/>Section</b> | <b>Licensee Strategy (Table)</b>   |
| 2.3.1   | Spent Fuel Pool Spray – External Strategy (Table A.2-3)                    |
| 3.4.4   | Manually Depressurize Steam Generators and Use Portable Pump (Table A.4-4) |

b. Findings

One finding was identified and is discussed in Inspection Report 05000456/2012404; 05000457/2012404.

**4. OTHER ACTIVITIES**

4OA2 Identification and Resolution of Problems (71152)

a. Inspection Scope

The inspectors reviewed the licensee’s corrective action program procedures and samples of corrective action documents to verify that the licensee was identifying issues related to the Fire Protection Program at an appropriate threshold and entering them in the corrective action program. The inspectors reviewed selected samples of condition reports, design packages, and fire protection system non-conformance documents.

b. Findings

Failure to Install Foam-Water Sprinklers In Accordance With Sprinkler Standard:

Introduction: The inspectors identified a finding of very low safety significance (Green) and associated cited violation (VIO) of License Condition 2.E for the failure to implement the approved Fire Protection Program by failing to install foam-water sprinklers in accordance with the standard for installing sprinklers. Specifically, the licensee failed to correct significant obstructions to foam-water sprinklers in the Unit 2 2B diesel oil storage tank room that were previously identified by the NRC in a Non-Cited Violation in May 2010.

Description: The inspectors identified several obstructions to sprinkler heads in the 2B diesel oil storage tank room. Specifically, the two sprinklers located near Points "A" and "B" on Branch Lines 2 and 3, respectively, (from drawing M-603; "Auxiliary Building, Viking Sprinkler Systems, Area 2T1 and 2T2; Floor El. 401'-0") were located between two ventilation ducts. The sprinkler located near Point "A" was less than one foot from the ventilation duct to the east (towards the tank) and the deflector was approximately four inches above the bottom of the ventilation duct. The sprinkler head near Point "B" was approximately four inches from the ventilation duct to the east (towards the tank) and the deflector was over eight inches above the bottom of the ventilation duct. In addition to the two obstructed sprinklers heads, the room had a 60 inch x 75 inch platform almost directly below the sprinkler near Point "B" on the west side of the room.

Section 2.3.10.2 of the Braidwood Station Fire Protection Report stated that the primary extinguishing system for the 2B diesel oil storage tank room was a manual protein foam-water system. 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, "Deluge Foam-Water Sprinkler and Spray Systems." Section 4.2.1 of NFPA 16 – 1980 required compliance with applicable requirements of various NFPA standards, including standard NFPA 13, "Standard for the Installation of Sprinkler Systems." 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.

The ventilation ducts presented obstructions similar to that of beams and storage as discussed in Sections 4-2.4.6 and Section 4-2.5.1, respectively, of NFPA 13 – 1985. 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. In addition, Section 4.2.5.1 of NFPA 13 – 1985 specified that a minimum of 18 inches clearance be maintained between top of storage and ceiling sprinkler deflectors. The ventilation ducts did not satisfy the 18 inch clearance requirement for the two sprinklers.

These obstructions were previously identified. In 2009, the NRC-identified an Unresolved Item (URI) (URI 05000456/2009006-02; 05000457/2009006-02, Inspection Report 05000456/2009006; 05000457/2009006, ADAMS Accession Number ML090780881) concerning sprinkler obstructions in the diesel oil storage tank rooms.

At the time, it was questioned whether the NFPA 13, "Standard for Installation of Sprinkler Systems," requirements for obstructions applied to NFPA 16, "Deluge Foam-Water Sprinkler and Spray Systems," such as the systems installed for the diesel oil storage tank rooms. The NRC and the licensee agreed to seek a formal NFPA code determination to address the issue.

In response to the request for a formal code interpretation, an NFPA fire protection specialist responded by letter to the licensee dated June 2, 2009. The response stated:

"... We cannot process a Formal Interpretation for text that clearly and decisively provides the requested information."

"In my opinion, Section 7.3.1 of NFPA 16 is clear. Sprinklers are required below open grate flooring if this flooring is wider than 4 feet. Additionally, the other obstruction rules of NFPA 13 apply. Unless the AHJ [Authority Having Jurisdiction] is considering the installation as an equivalent or alternative design in accordance with Section 1.5 of NFPA 16, the obstruction rules of NFPA 13 still apply. Nothing in NFPA 13 or NFPA 16 allows these additional sprinklers to be omitted or the compliance with NFPA 13's obstruction rules to be waived based on an "acceptable" performance test."

In 2010, based on the response provided by NFPA, the NRC characterized the issue as a Non-Cited Violation (NCV), (NCV 05000457/2010002-04, Inspection Report 05000456/2010002; 05000457/2010002, ADAMS Accession Number ML101340689), due to sprinkler obstructions in the 2B diesel oil storage tank room and closed the URI. In addition to the above NCV, a similar NCV was issued in 2008 for other sprinkler obstructions in diesel oil storage tank rooms (NCV 05000456/2008004-01; 05000457/2008004-01, Inspection Report 05000456/2008004, ADAMS Accession Number ML083190809).

During this inspection, the inspectors determined that no physical modifications had been performed to address the sprinkler obstructions in the 2B diesel oil storage tank room. The licensee performed an evaluation (Engineering Change 380157, "GL [Generic Letter] 86-10 Evaluation of Unit 1 an Unit 2 Diesel Fuel Oil Storage Tank rooms Foam-Water System NFPA 13 Deviations," Revision 0) and concluded that the overhead obstructions had a minimal impact on the foam-water system's ability to operate and effectively provide a vapor barrier blanket in the room. In addition, the licensee had changed their Fire Protection Report to reflect that the obstructions were acceptable. The inspectors reviewed two previous Issue Reports (IRs) associated with DOST foam-water sprinkler system obstructions (IR 00799972, "NRC Questions Scaffold Decking in DOST Rooms," dated July 24, 2008, and IR 00809865, "NRC Issues with DOST Foam Sprinkler System Design," dated August 22, 2008), and determined that the licensee had closed the IRs with the corrective actions reflected as being complete.

The inspectors disagreed with the conclusion documented for the evaluation associated with Engineering Change (EC) 380157. The licensee had made the argument that the obstructions would not affect the performance of a foam system. However, the inspectors noted that NFPA 16 systems were intrinsically water systems, as well as foam systems. The NFPA stated that the NFPA 13 criteria for obstructions applied to



NFPA 16 systems, as well as NFPA 13 systems. No obstruction criteria existed for foam only systems. The inspectors determined that classifying the diesel oil storage tank room suppression systems as foam only systems would render the systems as non-NFPA 16 systems, which was beyond the licensing basis for Braidwood Station. In addition, the inspectors noted that the vendor data sheet for the foam-water sprinklers used in the room specified that not less than two foam-water sprinklers were to be installed in order to obtain pattern overlap. Based on the vendor data sheet information, the inspectors concluded that obstructions were an important consideration for foam systems, as well as water systems. The inspectors concluded that the licensee had failed to restore compliance within a reasonable period of time after the 2010 NCV had been identified.

In response to the inspectors' concerns, the licensee initiated IR 01404288, "Potential Green NCV – Inadequate FP [Fire Protection] GL 86-10 Evaluation diesel oil storage tank," dated August 23, 2012. As discussed in IR 01404288, the licensee planned to survey each of the four diesel oil storage tank rooms for obstructions to determine the scope of physical changes needed to bring each room into compliance with NFPA 13. The issue report further noted that design changes would then be required to modify the systems. The licensee will address corrective actions as part of their response to the Notice of Violation.

Analysis: The inspectors determined that the failure to install foam-water sprinklers in accordance with the standard for installing sprinklers was contrary to NFPA 13 and License Condition 2.E. and was a performance deficiency. Specifically, the licensee failed to correct significant obstructions to foam-water sprinklers in the 2B diesel oil storage tank room that were previously identified by the NRC in a Non-Cited Violation in May 2010.

The finding was determined to be more than minor because the failure to install foam-water sprinklers in accordance with the standard for installing sprinklers 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 that respond to initiating events to prevent undesirable consequences (i.e., core damage). Specifically, the significant obstructions to foam-water sprinklers in the 2B diesel oil storage tank room could adversely affect the application of foam or water suppressant in the event of a fire.

In accordance with Inspection Manual Chapter (IMC) 0609, "Significance Determination Process," Attachment 0609.04, "Phase I - 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 I evaluation, the finding was assigned to the finding category, "Fixed Fire Protection Systems." The finding was assigned a moderate degradation rating because less than 25 percent of the foam-water sprinkler heads were affected. 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 (FDS) 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 Significance Determination

Process (SDP) as a risk contributor. Consequently, this issue screened as one of very low safety-significance (Green). This finding has a cross-cutting aspect in the area of Problem Identification and Resolution, Corrective Action Program. Specifically, the failure to install foam-water sprinklers in accordance with the standard for installing sprinklers was associated with the Corrective Action Program because the issue had been previously identified by the NRC and the resolution did not address the cause, (i.e., the physical installation). [P.1(c)]

As the licensee has not corrected the violation which was previously issued in May 2010, the conditions for making this issue Non-Cited as listed in Section 2.3.2a(2) of the Enforcement Policy are not met; therefore, the violation is being cited in the Notice of Violation.

#### 4OA5 Other Activities

##### Observation of Unannounced Fire Drill

###### a. Inspection Scope

On June 14, 2012, the inspectors observed the fire brigade activation and response to an unannounced fire drill in the turbine building (TB). The drill scenario that was used was 20.09.06.08, "TB-369 Flammable Cabinet Fire," Revision 10. The inspectors evaluated the readiness of the plant fire brigade to fight fires. The inspectors verified that the licensee staff identified deficiencies and openly discussed them in a self-critical manner during the drill debrief, and took appropriate corrective actions. Specific attributes evaluated were:

- proper wearing of turnout gear and self-contained breathing apparatus (SCBA);
- proper use and layout of fire hoses;
- employment of appropriate firefighting techniques;
- sufficient firefighting equipment brought to the scene;
- effectiveness of fire brigade leader communications, command, and control;
- search for victims and propagation of the fire into other plant areas;
- smoke removal operations;
- utilization of pre-planned strategies;
- adherence to the pre-planned drill scenario; and
- drill objectives.

###### b. Findings

##### Failure to Address Fire Brigade Performance Deficiencies

Introduction: The inspectors identified a finding (FIN) of very low safety significance (Green) for the licensee's failure to address fire brigade drill performance deficiencies identified after completion of an unannounced fire drill. Specifically the licensee failed to address the need to wait for the fire brigade leader's determination that it was safe to use elevators.

Description: On June 14, 2012, an inspector observed an unannounced fire drill and the post drill critique. During the drill, the inspector was located across from the elevator on the 369 foot elevation of the turbine building. The inspector observed the elevator door

open with three members of the fire brigade in the elevator. Two of the fire brigade members were each dressed out in firefighting gear, including self-contained breathing apparatus (SCBA), and the third was not. The individual not dressed out was performing a supporting role and was not an active member of the brigade. At this time, the inspector was the only observer located in the vicinity of the turbine building elevator.

When the elevator doors opened, the fire brigade members realized that the simulated fire was located directly across from the elevator, remained on the elevator, and rode the elevator back up to a higher floor. The remainder of the drill proceeded as expected and the simulated fire was suppressed by two additional fire brigade members who entered the area using a door from an adjoining area.

Following the drill, the licensee conducted a post drill critique during which the use of the elevator by members of the fire brigade was not addressed. However, the use of elevators was covered by two of the objectives of fire drill scenario 20.09.06.08, the drill that was conducted. The fire drill scenario was located in Attachment 3 to Procedure OP-AA-201-003, "Fire Drill Performance," Revision 10. One objective stated, in part, that, "Access to fire scene is directed such that brigade members do not ride the TB-369 elevator to the fire floor unless determined to be safe by the Brigade Leader." Another objective stated that, "Access to the fire scene is of particular importance since this fire is in close proximity to the TB elevator." That objective also referenced fire training module FPB11. Section XV, "Use of Elevators during Fires," of training module FPB11 stated that, "The use of the plant elevators during a fire is a determination made by the fire brigade leader as part of his initial size up."

When questioned on the use of the elevator, the fire brigade members stated that they did not exit the elevator once the doors opened on the 369 foot elevation as they determined that the fire was located across from the elevator. They remained in the elevator, rode the elevator up to a higher floor, and proceeded down the stairs through an adjoining area. The fire brigade members had used the elevator to access the fire floor during the drill without waiting for the fire brigade leader's determination that it was safe to do so. In fact, the fire brigade leader had instructed the brigade members not to use the elevators. However, the brigade members in the elevator did not receive this communication until the elevator doors had closed and the elevator was on its way to the 369 foot elevation. It was not possible at that point to stop the elevator. The inspectors concluded that the fire brigade members should have waited for instructions from the fire brigade leader before using the elevator. The inspectors were concerned that the fire brigade could be overcome by fire, heat, or smoke if they used an elevator during an actual fire and that elevator opened near the fire. Such use could result in casualties and complicate fire suppression efforts.

In response to the inspector's concerns, the fire marshal stated that the use of elevators during fire drills was up to the individual fire brigade members. The fire drill evaluators concluded that proper cues, such as signs indicating the presence of smoke or other fire effects, were not located in the elevators to give warning to the fire brigade members.

The licensee captured this observation in IR 01378314, "LL – NRC 6/14/12 Fire Drill Observations," dated June 14, 2012, and revised the scenario to place a cue inside the elevator so that the cue would be available no matter where the elevator was accessed. The licensee's corrective action program documented the resolution of IR 01378314 as complete. The inspectors concluded that the corrective action of placing cues in the

elevator did not address the need to wait for the fire brigade leader's determination that it was safe to use elevators.

Section 4.2.5.1 of Procedure OP-AA-201-003, stated that "performance deficiencies of the Fire Brigade or of individual members should be addressed in the drill critique, quarterly training sessions, or remedied by additional training or other actions, as warranted." Therefore, the inspectors concluded that this corrective action did not satisfy Section 4.2.5.1 of Procedure OP-AA-201-003. The licensee captured the inspectors' concerns in IR 01403621, "Lessons Learned – 6/14/2012 Fire Drill Critique Issues," dated August 22, 2012, generated training requests to reinforce the proper use of elevators, and recommended that additional clarification be provided in procedure OP-AA-201-003 regarding the meeting of drill objectives.

Following the drill the licensee completed Attachment 1, "Fire Drill Record," of OP-AA-201-003 and concluded that the overall response was effective and satisfactory because the simulated fire was suppressed. Step 4.2.5.4 of OP-AA-201-003 allowed the drill controller to determine that the overall drill performance had been satisfactory even though individual performance deficiencies were identified provided the simulated fire was suppressed.

During the inspection the licensee also initiated IR 01398598, "NRC Identified Issues with 6/14/2012 Fire Drill," dated August 8, 2012, and recommended that Operations perform a work group evaluation and verify that training emphasized the practices related to elevator usage as specified in training module FPB11.

Analysis: The inspectors determined that the failure to address fire brigade drill performance deficiencies identified after the completion of an unannounced fire drill was contrary to Step 4.2.5.1 of Procedure OP-AA-201-003 and was a performance deficiency. Specifically, the licensee failed to address the need to wait for the fire brigade leader's determination that it was safe to use elevators.

The finding was determined to be more than minor because the finding, if left uncorrected, would become a more significant safety concern. Specifically, the improper use of elevators by the fire brigade during a fire could impact the ability of the brigade to fight a fire as smoke, heat, or flames could affect fire brigade members upon opening of elevator doors on the fire floor. The inspectors concluded this finding was associated with the Mitigating Systems cornerstone attribute of Protection Against External Factors (Fire) and affected the cornerstone objective of ensuring the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences (i.e., core damage).

In accordance with IMC 0609, "Significance Determination Process," Attachment 0609.04, "Phase I - Initial Screening and Characterization of Findings," Table 3b the inspectors determined the finding degraded the fire protection defense-in-depth strategies. However, screening under IMC 0609, Appendix F, "Fire Protection Significance Determination Process," was not appropriate because it does not address issues related to fire brigade performance. Therefore, the significance of the issue was determined using IMC 0609, Appendix M, "Significance Determination Process Using Qualitative Criteria," and discussion with NRC regional management. Although fire brigade performance was affected, the inspectors determined that the finding was of very low safety significance (Green) because the simulated fire was successfully suppressed by individuals who did not use the elevator.

This finding has a cross-cutting aspect in the area of Human Performance, Work Practices because the licensee did not enforce expectations on not proceeding in the face of uncertainty or unexpected conditions. Specifically, the licensee's fire brigade members used elevators to arrive at the fire floor without waiting for the fire brigade leader to determine that it was safe to do so. [H.4(a)]

Enforcement: The licensee established OP-AA-201-003, "Fire Drill Performance" as the implementing procedure for conducting fire drills. Section 4.2.5.1 of Procedure OP-AA-201-003, stated that, "performance deficiencies of the Fire Brigade or of individual members should be addressed in the drill critique, quarterly training sessions, or remedied by additional training or other actions, as warranted."

Contrary to the above, on June 14, 2012, the licensee failed to address fire brigade drill performance deficiencies identified after the completion of an unannounced fire drill. During the drill critique and in the proposed corrective actions, the licensee did not address the improper use of elevators by the fire brigade until prompted by the inspector. Specifically the licensee's proposed corrective actions were to revise the scenario to place cues inside the elevator rather than address the need to wait for the fire brigade leader's determination that it was safe to use elevators.

This finding does not involve enforcement action because no regulatory requirement violation was identified. This finding is identified as a FIN because it does not involve a violation, is of very low safety significance, and was entered into the licensee's corrective action program as IRs 01378314, 01398598, and 01403621. (FIN 05000456/2012008-02; 05000457/2012008-02, Failure to Address Fire Brigade Performance Deficiencies)

#### 4OA6 Management Meetings

##### .1 Exit Meeting Summary

On September 7, 2012, the inspectors presented the inspection results to Ms. A. Ferko, 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 Interim Exit Meeting

On August 24, 2012, the inspectors presented the preliminary inspection results to Mr. D. Enright, and other members of the licensee staff.

ATTACHMENT: SUPPLEMENTAL INFORMATION

## SUPPLEMENTAL INFORMATION

### KEY POINTS OF CONTACT

#### Licensee

D. Enright, Site Vice-President  
M. Kanavos, Plant Manager  
A. Ferko, Engineering Director  
M. Marchionda-Palmer, Operations Director  
P. Raush, Senior Manager, Design Engineering  
T. Tierney, Operations Support Manager  
C. VanDenburgh, Regulatory Assurance Manager  
B. Finlay, Security Manager  
D. Riedinger, Manager, Design Engineering

#### Nuclear Regulatory Commission

S. Reynolds, Director, Division of Reactor Safety  
B. Dickson, Chief, Health Physics and Incident Response Branch  
K. Riemer, Chief, Reactor Projects Branch 2  
J. Benjamin, Senior Resident Inspector  
A. Garmoe, Resident Inspector

### LIST OF ITEMS OPENED, CLOSED AND DISCUSSED

#### Opened and Closed

|   |     |  |
|---|-----|--|
| 05000457/2012008-01                         | VIO | Failure to Install Foam-Water Sprinklers In Accordance With Sprinkler Standard (Section 4OA2b) |
| 05000456/2012008-02;<br>05000457/2012008-02 | FIN | Failure to Properly Address Fire Brigade Performance Deficiencies (Section 4AO5b)              |

## 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.

### ANALYSES AND EVALUATIONS

| <u>Number</u> | <u>Description or Title</u>  | <u>Date or Revision</u> |
|---------------|--|-------------------------|
| EC 380157     | GL 86-10 Evaluation of Unit 1 and Unit 2<br>Diesel Fuel Oil Storage Tank Rooms<br>Foam-Water System NFPA 13 Deviations | 0                       |

### CALCULATIONS

| <u>Number</u> | <u>Description or Title</u>   | <u>Date or Revision</u> |
|---------------|---|-------------------------|
| 19-AN-3       | Protective Relay Settings for 4.16 kV ESF<br>Switchgear                   | 16                      |
| 19-AN-5       | Diesel Generator Protective Relay Settings                                | 3                       |
| 19-AU-4       | 480V Unit Substation Breaker and Relay<br>Settings                        | 18                      |
| BRW-97-0473   | Circuit Breaker Trip Settings-125V dc and<br>250V dc Distribution Centers | 1                       |
| BRW-97-0475   | 125V dc Fuse Sizing and Coordination                                      | 0                       |

### CORRECTIVE ACTION PROGRAM DOCUMENTS ISSUED DURING INSPECTION

| <u>Number</u> | <u>Description or Title</u>                                    | <u>Date or Revision</u> |
|---------------|--|-------------------------|
| IR 01393564   | NRC Triennial FP Inspection – Security<br>Training of B.5.b    | July 26, 2012           |
| IR 01394082   | NRC Observations During Fire Protection<br>Triennial (B.5.b)   | July 27, 2012           |
| IR 01398030   | NRC-Identified – Labeling Enhancement –<br>2AP05ES             | August 7, 2012          |
| IR 01398037   | NRC-Identified – 2B D/G Output Breaker<br>Labeling Enhancement | August 7, 2012          |
| IR 01398065   | NRC-Identified – BWOP FP-100T35 has<br>Reference Error         | August 7, 2012          |
| IR 01398094   | NRC-Identified Housekeeping Issue –<br>Ladder Storage          | August 7, 2012          |
| IR 01398598   | NRC-Identified Issues with June 14, 2012<br>Fire Drill         | August 8, 2012          |
| IR 01398786   | NRC-Identified – BWOP FP-100T35<br>Enhancement                 | August 8, 2012          |
| IR 01399021   | NRC-Identified – BWOP FP-100T Series<br>Proc. Enhancements     | August 9, 2012          |

**CORRECTIVE ACTION PROGRAM DOCUMENTS ISSUED DURING INSPECTION**

| <b><u>Number</u></b> | <b><u>Description or Title</u></b>                           | <b><u>Date or Revision</u></b> |
|----------------------|--|--------------------------------|
| IR 01402981          | Safe Shutdown Analysis Requires Clarification                | August 21, 2012                |
| IR 01403387          | MA-BR-726-633 Procedure Enhancement                          | August 22, 2012                |
| IR 01403621          | LL-6/14/2012 Fire Drill Critique Issues                      | August 22, 2012                |
| IR 01404288          | Potential Green NCV – Inadequate FP GL 86-10 Evaluation DOST | August 23, 2012                |
| IR 01404324          | 2012 NRC FP Inspection Observation                           | August 23, 2012                |
| IR 01404336          | 2012 NRC FP Inspection Observation Stairwell Sprinklers      | August 23, 2012                |

**CORRECTIVE ACTION PROGRAM DOCUMENTS REVIEWED**

| <b><u>Number</u></b> | <b><u>Description or Title</u></b>                               | <b><u>Date or Revision</u></b> |
|----------------------|--|--------------------------------|
| IR 00799972          | NRC Questions Scaffold Decking in DOST Rooms                     | July 24, 2008                  |
| IR 00809865          | NRC Issues with DOST Foam Sprinkler Design                       | August 22, 2008                |
| IR 01137149          | Byron NRC FP Triennial Inspection Concern – 4 kV Bus Restoration | November 8, 2010               |
| IR 01147300          | Byron IR Applicable to Braidwood-DC Circuit Breakers             | December 2, 2010               |
| IR 01200231          | NER 11-009 Identified Vulnerability with Radio Design            | April 9, 2011                  |
| IR 01282334          | Pre NRC Triennial Inspection Self-Assessment                     | June 1, 2012                   |
| IR 01300720          | Radio Transmission Problem                                       | December 10, 2011              |
| IR 01326033          | NRC Green NCV – Inadequate Maintenance Rule Evaluation of CQ     | February 13, 2012              |
| IR 01378314          | LL – NRC 6/14/12 Fire Drill Observations                         | June 14, 2012                  |
| IR 01390780          | Perform Formal Evaluation of Flammable Gas Bottles               | July 19, 2012                  |
| IR 01395499          | Maintenance Rule Performance Criteria CQ1 Exceeds CME Limit      | July 31, 2012                  |

**DRAWINGS**

| <b><u>Number</u></b> | <b><u>Description or Title</u></b>                                | <b><u>Date or Revision</u></b> |
|----------------------|---|--------------------------------|
| 20E-0-3301           | Electrical Installation Auxiliary Building Plan Elevation 346'-0" | CH                             |
| 20E-0-3663           | Cable Pans Routing Auxiliary Building Plan Elevation 401'-0"      | AV                             |
| 20E-0-4001           | Station One Line Diagram  | AA                             |
| 20E-0-4001B          | Station Key Diagram   | AI                             |
| 20E-0-4008AG         | Tabulation of Trip Settings, 480V Turbine                         | Q                              |



## DRAWINGS

| <u>Number</u> | <u>Description or Title</u>   | <u>Date or Revision</u> |
|---------------|---|-------------------------|
| 20E-1-3341    | Building MCC 033W3<br>Electrical Installation Auxiliary Building<br>Plan Elevation 415'-0"        | BJ                      |
| 20E-1-4002E   | Single Line Diagram 120V AC ESF<br>Instrument Inverter Bus 111 and 113                            | M                       |
| 20E-1-4010A   | Key Diagram 125V DC Distribution Center<br>Bus 111  | M                       |
| BR-E-10       | CT Gypsum with Sheet Metal Collar for<br>Fire/Air Seals at Cable Tray/Cable<br>Openings in Floors | E                       |
| M-603, Sh. 71 | Auxiliary Building, Viking Sprinkler<br>Systems, Area 2T1 and 2T2, Floor El.<br>401'-0"           | D                       |
| M-603, Sh. 94 | Auxiliary Building, Viking Sprinkler<br>Systems, Area 1-KK6, Floor Elev. 346.0",<br>Unit 1        | B                       |

## PROCEDURES

| <u>Number</u>  | <u>Description or Title</u>   | <u>Date or Revision</u> |
|----------------|---|-------------------------|
| 1BwOA ELEC-3   | Loss of 4 kV ESF Bus Unit 1   | 101                     |
| 1BwOA ELEC-5   | Local Emergency Control of Safe<br>Shutdown Equipment Unit 1  | 104                     |
| 20.09.06.08    | TB-369 Flammable Cabinet Fire   | 10                      |
| BwAP 1100-21   | Gaseous Suppression System Areas;<br>Special Precautions  | 9                       |
| BwAP 320-1     | Shift Staffing  | 21                      |
| BwOP CO-5      | Manual Actuation of the Carbon Dioxide<br>Fire Suppression Systems  | 6                       |
| BwOP DC-7-111  | 125V DC ESF Bus 111 Cross-<br>Tie/Restoration   | 11                      |
| BwOP FP-100    | Fire Response Guidelines  | 10                      |
| BwOP FP-100T31 | Fire Zones 3.1-1, 3.1-2 Unit 1/Unit 2 Cable<br>Tunnels 1D-64, 1D-65, 2D-64, 2D-65, 2S-<br>47  | 6                       |
| BwOP FP-100T35 | Fire Zones 5.5-1 and 5.5-2 Unit 1/Unit 2<br>Auxiliary Electrical Equipment Rooms 1D-<br>69, 2D-69   | 6                       |
| BwOP FP-100T37 | Fire Zones 9.1-1, 9.1-2, 9.2-2, 9.3-1, 9.3-2,<br>9.4-1 Unit 1/Unit 2 Diesel Generator and<br>Diesel Generator Day Tank Rooms 1D-71,<br>1D-72, 1S-37, 1S-38, 1S-39, 1S-40, 2D-71,<br>2D-72, 2S-37, 2S-38, 2S-39, 2S-40 | 5                       |
| BwOP FP-100T51 | 11.2-0 346' Auxiliary Building General Area<br>2D-17, 2D-40   | 4                       |

## PROCEDURES

| <u>Number</u>         | <u>Description or Title</u>  | <u>Date or Revision</u> |
|-----------------------|--|-------------------------|
| BwOP MS-6             | Local Operation of the Steam Generator<br>Power Operated Relief Valves                       | 13                      |
| MA-AA-723-325         | Molded Case Circuit Breaker Testing  | 10                      |
| MA-AA-723-350         | Emergency Lighting Battery Pack<br>Inspection and Test                                       | 11                      |
| MA-AA-725-102         | Preventive Maintenance on Westinghouse<br>Type DHP 4 kV, 6.9 and 13.8 kV Circuit<br>Breakers | 7                       |
| MA-AA-725-562         | Preventive Maintenance on Westinghouse<br>Type DS 480 V Circuit Breakers                     | 6                       |
| MA-BR-726-633         | Installation of Post-Fire Cold Shutdown<br>Emergency Cable                                   | 2                       |
| MA-BR-773-501         | Braidwood Unit 1 4 kV UAT, SAT and Bus<br>Tie Breakers Relay Routine                         | 3                       |
| MA-BR-773-511         | Braidwood Unit 1 480 V Unit Substation<br>Feed Breaker Relay Routine                         | 1                       |
| OP-AA-201-001         | Fire Marshall Tours  | 5                       |
| OP-AA-201-003         | Fire Drill Performance   | 10                      |
| OP-AA-201-003         | Fire Drill Performance   | 12                      |
| OP-AA-201-004         | Fire Prevention for Hot Work   | 9                       |
| OP-AA-201-005         | Fire Brigade Qualification   | 8                       |
| OP-AA-201-008         | Pre-Fire Plan Manual   | 3                       |
| OP-BR-102-106         | Operator Response Time Program at<br>Braidwood Station                                       | 0                       |
| OP-BR-201-009         | Control of Transient Combustible Program   | 0                       |
| PRE-FIRE PLAN<br>#101 | FZ 11.2-0; AB 346' Aux. Bldg. General<br>Area (South)  | 0                       |
| PRE-FIRE PLAN #98     | FZ 11.2-0; AB 346' Unit 2 Aux. Bldg.<br>General Area (Center)                                | 0                       |
| PRE-FIRE PLAN #99     | FZ 11.2-0; AB 346' Unit 1 Aux. Bldg.<br>General Area (North)                                 | 0                       |

## REFERENCES

| <u>Number</u> | <u>Description or Title</u>                         | <u>Date or Revision</u> |
|---------------|---|-------------------------|
| FBP11         | Emergency Response Training Fire<br>Brigade Program | 9                       |

## WORK ORDERS

| <u>Number</u> | <u>Description or Title</u>                               | <u>Date or Revision</u> |
|---------------|---|-------------------------|
| 01357192      | Cable Tunnel Area 1DD Low Press CO2<br>Sys Actuation 18 M | May 29, 2012            |
| 01391113      | 18 Mo. Visual Inspection of SR Fire<br>Dampers (1A)       | April 3, 2012           |

## **WORK ORDERS**

| <b><u>Number</u></b> | <b><u>Description or Title</u></b>  | <b><u>Date or Revision</u></b> |
|----------------------|---|--------------------------------|
| 01391498             | 0B Fire Protection Pump Flow and Pressure Test  | July 5, 2012                   |
| 01393816             | DG RM 1A Low Press CO2 Actuation Surveillance   | July 12, 2012                  |
| 01421457             | U1 Diesel Fuel Oil Storage Tank Room Foam Sprinkler Hdr and Del Noz Air Flo                                   | July 4, 2011                   |
| 01449872             | 1A Lake Screen House Forebay Inspection Report  | August 28, 2011                |
| BwSD-CO-20           | Carbon Dioxide Fire Protection Diesel Generator Rooms 1A and 1B and Diesel Generator Day Tank Rooms 1A and 1B | August 10, 1984                |
| BwSD-CO-21           | CO2 BOP Fire Protection   | July 22, 1986                  |

## LIST OF ACRONYMS USED

|       |  |
|-------|--|
| AC    | Alternating Current                          |
| ADAMS | Agencywide Document Access Management System |
| AHJ   | Authority Having Jurisdiction                |
| CFR   | Code of Federal Regulations                  |
| DC    | Direct Current                               |
| DOST  | Diesel Oil Storage Tank                      |
| EC    | Engineering Change                           |
| EI    | Elevation                                    |
| ESF   | Essential Safety Feature                     |
| FDS   | Fire Damage State                            |
| FIN   | Finding                                      |
| FP    | Fire Protection                              |
| FSAR  | Final Safety Analysis Report                 |
| GL    | Generic Letter                               |
| IMC   | Inspection Manual Chapter                    |
| IP    | Inspection Procedure                         |
| IR    | Inspection Report                            |
| IR    | Issue Report                                 |
| kV    | Kilovolt                                     |
| NCV   | Non-Cited Violation                          |
| NEI   | Nuclear Energy Institute                     |
| NFPA  | National Fire Protection Association         |
| NRC   | U.S. Nuclear Regulatory Commission           |
| PARS  | Publicly Available Records                   |
| SCBA  | Self-Contained Breathing Apparatus           |
| SDP   | Significance Determination Process           |
| SSD   | Safe Shutdown                                |
| TB    | Turbine Building                             |
| TI    | Temporary Instruction                        |
| URI   | Unresolved Item                              |
| V     | Volt   |
| VIO   | Violation                                    |

If you contest the subject or severity of the violation you should provide a response within 30 days of the date of this inspection report, with the basis for your denial, to the U.S. Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington DC 20555-0001; with a copy to the Regional Administrator, U.S. Nuclear Regulatory Commission – Region III, 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 NRC Resident Inspector office at the Braidwood Station. In addition, if you disagree with the cross-cutting aspect assigned to 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 the Braidwood Station.

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

Sincerely,

/RA/

Steven A. Reynolds, Director  
Division of Reactor Safety

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

Enclosure: Inspection Report 05000456/2012008;  
05000457/2012008 and Notice of Violation  
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| DATE   | 09/17/12 |  | 09/19/12 |  | 09/19/12  |  | 09/24/12  |  |  |

**OFFICIAL RECORD COPY**

Letter to Mr. Michael J. Pacilio from Mr. Steven A. Reynolds dated September 24, 2012.

SUBJECT: BRAIDWOOD STATION, UNITS 1 AND 2  
TRIENNIAL FIRE PROTECTION INSPECTION REPORT  
05000456/2012008; 05000457/2012008 AND NOTICE OF VIOLATION

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