



**UNITED STATES  
NUCLEAR REGULATORY COMMISSION**

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

June 29, 2011

EA 11-052

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  
EXERCISE OF ENFORCEMENT DISCRETION 05000456/2011010;  
05000457/2011010**

Dear Mr. Pacilio:

On June 10, 2011, the U. S. Nuclear Regulatory Commission (NRC) completed an evaluation of an Unresolved Item (URI) in inspection report 05000456/2011009-01; 05000457/2011009-01 that addressed the licensing bases requirements for a condition related to the analysis of steam generator tube rupture (SGTR) event margin to overfill and the preservation of safety-related equipment functions. The enclosed report documents the results of the evaluation, which were discussed on June 10, 2011, with members of your staff.

From January 13, 2011 through January 14, 2011, the NRC performed a verification inspection at your site. The intent of the inspection was to determine if a condition that had been previously identified at the Byron Station was also applicable at the Braidwood Station. As a result of the inspection, an Unresolved Item (05000456/2011009-01; 05000457/2011009-01), which required further staff evaluation was identified.

The enclosure to this letter closes that Unresolved Item and documents a violation of 10 CFR Part 50, Appendix B, Criterion III, "Design Control" for the failure to ensure the steam generator power operated relief valves (SG PORVs) power supplies met the design bases. Specifically, you failed to ensure the SG PORVs were capable of performing their safety function assuming a single failure as defined by 10 CFR Part 50 Appendix A "General Design Criteria for Nuclear Power Plants" in the SGTR analysis.

Although the issue constitutes a Severity Level IV violation of NRC requirements, we have concluded that because a compliance backfit was issued to resolve the technical issue, the violation resulted from matters not reasonably within Exelon's ability to foresee and correct; and therefore, was not a performance deficiency.

Using the NRC's Enforcement Policy, the violation met the criteria for enforcement discretion. As such, I have been authorized, after consultation with the Director, NRC Office of

Enforcement and the Region III Regional Administrator, to exercise enforcement discretion in accordance with Section 3.5 of the Enforcement Policy and refrain from issuing enforcement action for the violation. If you disagree with the characterization of this violation, you should provide a response within 30 days of the date of this letter, with the basis for your disagreement, to 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; and the Resident Inspector Office 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 document system (ADAMS). ADAMS is accessible from the NRC Website 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 05000456/2011010; 05000457/2011010  
w/Attachment: Supplemental Information

cc w/encl: Distribution via ListServ

U.S. NUCLEAR REGULATORY COMMISSION

REGION III

Docket Nos: 05000456; 05000457

License Nos: NPF-72; NPF-77

Report No: 05000456/2011010; 05000457/2011010

Licensee: Exelon Generation Company, LLC

Facility: Braidwood Station, Units 1 and 2

Location: Braceville, IL

Dates: February 1 through June 10, 2011

Inspector: J. Corujo-Sandin, Reactor Inspector

Approved by: A.M. Stone, Chief  
Engineering Branch 2  
Division of Reactor Safety

Enclosure

## **SUMMARY OF FINDINGS**

IR 05000456/2011010; 05000457/2011010; 2/1/11-6/10/11; Exercise of Enforcement Discretion.

This report covers several weeks of inspection by a regional inspector. This report contains one NRC-identified violation of NRC regulations, which has been dispositioned using enforcement discretion. 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.

## REPORT DETAILS

### 1. REACTOR SAFETY

#### Cornerstones: Initiating Events, Mitigating Systems, and Barrier Integrity

#### 4OA5 Other Activities (71111.01)

#### .1 (Closed) Unresolved Item 05000456/2011009-01; 05000457/2011009-01, Concerns with Licensee's Margin to Overfill Analysis Related to Steam Generator Tube Rupture (SGTR) Event

##### a. Inspection Scope

The inspectors pursued resolution to a previously identified Unresolved Item (URI) 05000456/2011009-01; 05000457/2011009-01 concerning the ability of the power supplies for the steam generator power operated relief valves (SG PORVs) to meet the single failure criteria. This issue was unresolved pending review of the licensee's response to the identified non-compliance.

##### b. Results

Introduction: The NRC staff identified a violation of 10 CFR Part 50, Appendix B, Criterion III, "Design Control" for the failure to ensure the SG PORVs power supplies met the design bases. Specifically, the licensee failed to ensure the SG PORVs were capable of performing their safety function assuming a single failure as defined by 10 CFR Part 50, Appendix A, "General Design Criteria for Nuclear Power Plants" in their SGTR analysis. The Issue of Concern (IOC) constituted a violation of NRC requirements. However, since the IOC resulted in a backfit, the staff concluded that a licensee performance deficiency (PD) did not exist, because the violation resulted from matters not reasonably within Exelon's ability to foresee and correct. Using the NRC's Enforcement Policy, the violation met the criteria for enforcement discretion.

Description: During the 2009 Byron Station's Component Design Bases Inspection (CDBI), documented in Inspection Report 05000454/2009007; 05000455/2009007, the inspectors identified a concern related to the appropriateness of the component failure assumed in a design bases Steam Generator Tube Rupture event. Specifically, the licensee's SGTR accident analysis was based on the single failure of one SG PORV to open when required. This issue was documented as URI (05000454/2009007-03; 05000455/2009007-03).

Following the Byron Station CDBI, the inspectors requested assistance from the Office of Nuclear Reactor Regulation (NRR) in providing a position on the single failure criteria in the SGTR accident analysis. The staff from NRR reviewed the issue and provided a response to Task Interface Agreement (TIA) No. 2010-002 by letter dated December 20, 2010, (ML103230177). In the response, NRR determined that the failure of a breaker to perform its safety function, regardless of how that failure occurs, is considered a single failure as defined by 10 CFR Part 50, Appendix A.

Because of the similarities in design and because several correspondences reviewed during the inspection at the Byron Station also included the Braidwood Station, the inspectors performed a verification inspection at the Braidwood Station in January 2011.

As documented in Inspection Report 05000456/2011009; 05000457/2011009, the inspectors confirmed the licensee had determined that the condition was also applicable to Braidwood. Based on the conclusions documented in TIA No. 2010-002, the inspector concluded the use of a single failure (including passive and active failures of electrical systems) should have been assumed in the SGTR event analysis for the Braidwood Station. Because the current NRC staff position regarding the requirement to evaluate single passive failures of the electrical components is compliant with Appendix A but was different than the staff position previously communicated to the licensee, the provisions of 10 CFR 50.109 were applicable. After consultation with NRR and the Office of General Counsel, the inspectors determined that no backfit analysis was required under 10 CFR 50.109(a)(2) because the provisions of 10 CFR 50.109 (a)(4), were applicable, in that, a modification is necessary to bring a facility into compliance with the rules or orders of the Commission.

On February 1, 2011, the NRC issued IR 05000456/2011009; 05000457/2011009, and notified the licensee of the agency's decision to issue a compliance backfit in order to address the technical issue. The report listed the licensee's initial corrective actions and requested the licensee to provide a written response within 30 days of their assessment of the issue and a description of their intended actions to address the noncompliance, including a proposed schedule to complete those actions and an assessment of the extent of condition of this issue. An URI 05000456/2011009-01; 05000457/2011009-01, was opened in order to track the resolution of the issue.

The licensee responded by letter dated March 2, 2011, and committed to the following:

1. The power supplies to the Steam Generators PORVs will be modified with a safety-related battery backup. The committed date for performing this action was no later than Unit 1's April 2012 refueling outage and Unit 2's October 2012 refueling outage.
2. The licensee will issue a supplement to their March 2, 2011, response letter, in order to communicate any revisions to the modification installation schedule based on the online/outage determination (i.e., whether the modification could be installed online or require an outage). The committed date for performing this action is October 14, 2011.
3. An extent of condition review will be conducted of other transients and accidents outlined in Chapter 15 of the Braidwood Station Updated Final Safety Analysis Report to identify similar discrepancies with respect to the inappropriate reliance or assumption of single active failure. The identified discrepancies, if any, would be resolved within the Corrective Action Program and communicated to the NRC Region III Regional Administrator. The committed date for performing this action is August 4, 2011.

The NRC staff considered these actions and timeframe adequate for complying with the agency's requirements.

Analysis: In accordance with the Reactor Oversight Process (ROP) Inspection Manual Chapter (IMC) 0612, Appendix B, "Issue Screening," the staff determined that this issue did not meet the definition for a performance deficiency since it was not reasonably within

the licensee's ability to foresee and correct. In accordance with Inspection Manual Chapter 0612, the inspectors determined whether this issue of concern involved a more than minor violation. In order to assess the significance of the underlying technical issue

associated with the violation, the inspectors used the guidance in IMC 0612, Appendix B, "Issue Screening," and IMC 0609, "Significance Determination Process." Based on these, the underlying technical issue was a Non-Finding (i.e., no performance deficiency), was considered a more-than-minor violation, and from a risk perspective, screened as having very low safety significance.

The inspectors determined that no example from either Section 6.1 or 6.9 of the Enforcement Policy adequately applied or described the situation. Therefore, Regional NRC management considered the risk significance of the underlying technical issue and, in consultation with the Office of Enforcement, determined the issue was best represented as a Severity Level IV violation.

This violation is not considered a finding; therefore, in accordance with IMC 0305, no cross-cutting aspect is assigned to the violation.

**Enforcement:** Title 10 CFR Part 50, Appendix B, Criterion III, "Design Control," states, in part, that measures shall be established to assure that applicable regulatory requirements and the design basis, as defined in § 50.2 and as specified in the license application, for those structures, systems, and components to which this appendix applies are correctly translated into specifications, drawings, procedures, and instructions.

Title 10 CFR Part 50 Appendix A defines single failure as:

"A single failure means an occurrence which results in the loss of capability of a component to perform its intended safety functions. Multiple failures resulting from a single occurrence are considered to be a single failure. Fluid and electric systems are considered to be designed against an assumed single failure if neither: (1) a single failure of any active component (assuming passive components function properly); nor (2) a single failure of a passive component (assuming active components function properly), results in a loss of the capability of the system to perform its safety functions."<sup>1</sup>

Contrary to the above, from February 1, 2011, the date when the licensee was informed of the issuance of a compliance backfit, until March 2, 2011, the date the licensee committed to the NRC, via letter, to restore compliance, the licensee failed to ensure the SG PORVs' power supplies met the design bases. Specifically, the licensee failed to ensure the SG PORVs were capable of performing their safety function assuming a single failure as defined by 10 CFR Part 50 Appendix A "General Design Criteria for Nuclear Power Plants" in their SGTR analysis.

The NRC staff determined that this violation resulted from matters not reasonably within the licensee's control; that is, the requirements could not be readily identified and therefore addressed. Enforcement Policy Section 3.5, "Violations Involving Special Circumstances", states in part, the "NRC may reduce or refrain from issuing a civil penalty or an NOV [Notice of Violation] for a Severity Level II, III, or IV violation based on the merits of the case after considering the guidance in this statement of policy and such factors as the age of the violation, the significance of the violation, the clarity of the requirement and associated guidance..." In this case, the lack of clarity of the requirement influenced the licensee's ability to comply. As stated above, an exemption

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<sup>1</sup> Single failures of passive components in electrical systems should be assumed in designing against a single failure.

to the backfit rule (a compliance backfit) was documented. Therefore, in accordance with the Enforcement Policy, and after consultation with the Director of the Office of Enforcement and the Region III Regional Administrator, the NRC has decided to exercise enforcement discretion in accordance with Section 3.5 of the NRC Enforcement Policy and to refrain from issuing enforcement action for the violation. In accordance with the NRC's Reactor Oversight Process, this condition will not be considered in the assessment process or the NRC's Action Matrix. The technical issue is considered open pending completion of the corrective actions (VIO 05000456/2011010-01; 05000457/2011010-01, Restoring Compliance with Respect to Single Failures).

#### 40A6 Management Meetings

##### .1 Exit Meeting Summary

On June 10, 2011, the NRC presented the inspection results to Mr. D. Enright, 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

**SUPPLEMENTAL INFORMATION  
KEY POINTS OF CONTACT**

Licensee

D. Enright, Site Vice President  
A. Ferko, Engineering Manager  
C. VanDenburgh, Regulatory Assurance Manager  
J. Gerrity, Exelon Regulatory Assurance

Nuclear Regulatory Commission

M. Satorius, Region III, Regional Administrator  
S. Reynolds, Director, Division of Reactor Safety  
E. Duncan, Chief, Division of Reactor Projects, Branch 3  
A.M. Stone, Chief, Division of Reactor Safety Engineering Branch 2  
J. Corujo-Sandín, Reactor Inspector, Division of Reactor Safety Engineering Branch 2

**LIST OF ITEMS OPENED, CLOSED AND DISCUSSED**

Opened

05000456/2011010-01; 05000457/2011010-01,	VIO	Restoring Compliance With Respect to Single Failures (Section 40A5.1.b)
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Closed

05000456/2011009-01; 05000457/2011009-01,	URI	Concerns with Licensee's Margin to Overfill Analysis Related to Steam Generator Tube Rupture Event
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Discussed

None

## LIST OF ACRONYMS USED

ADAMS	Agencywide Document Access Management System
CFR	Code of Federal Regulations
IMC	Inspection Manual Chapter
IR	Inspection Report
NCV	Non-Cited Violation
NRC	U.S. Nuclear Regulatory Commission
NRR	Nuclear Reactor Regulation
PARS	Publicly Available Records System
ROP	Reactor Oversight process
SG PORVs	Steam Generator Power Operated Relief Valves
SGTR	Steam Generator Tube Rupture
TIA	Task Interface Agreement
URI	Unresolved Item

M. Pacilio

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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 05000456/2011010; 05000457/2011010  
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