



Exelon Generation[®]

Exelon Generation Company, LLC www.exeloncorp.com
Braidwood Station
35100 South Route 53, Suite 84
Braceville, IL 60407-9619

10 CFR 50.73

July 19, 2016
BW160058

U. S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, DC 20555-0001

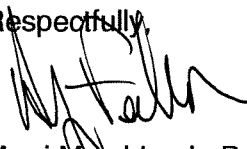
Braidwood Station, Units 1 and 2
Renewed Facility Operating License Nos. NPF-72 and NPF-77
NRC Docket Nos. STN 50-456 and STN 50-457

Subject: Licensee Event Report 2016-002-00 – Inadequate Protection from Tornado Missiles Identified Due to Non-Conforming Design Conditions

The enclosed Licensee Event Report (LER) is being submitted in accordance with 10 CFR 50.73, "Licensee Event Report System."

There are no regulatory commitments contained in this letter. Should you have any questions concerning this submittal, please contact Mr. Steven Reynolds, Regulatory Assurance Manager, at (815) 417-2800.

Respectfully,


for
Marri Marchionda-Palmer
Site Vice President
Braidwood Station

Enclosure: LER 2016-002-00

cc: NRR Project Manager – Braidwood Station
Illinois Emergency Management Agency – Division of Nuclear Safety
US NRC Regional Administrator, Region III
US NRC Senior Resident Inspector (Braidwood Station)
Illinois Emergency Management Agency – Braidwood Representative

bcc: Site Vice President – Braidwood Station
Director – Licensing
Manager, Licensing – Braidwood, Byron and LaSalle County Stations
Regulatory Assurance Manager – Braidwood Station
Braidwood Nuclear Licensing Administrator
Exelon Document Control Desk Licensing
Corporate Commitment Management Coordinator
Braidwood Commitment Management Coordinator



LICENSEE EVENT REPORT (LER)
(See Page 2 for required number of digits/characters for each block)

Estimated burden per response to comply with this mandatory collection request: 80 hours. Reported lessons learned are incorporated into the licensing process and fed back to industry. Send comments regarding burden estimate to the FOIA, Privacy and Information Collections Branch (T-5 F53), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by internet e-mail to Infocollects.Resource@nrc.gov, and to the Desk Officer, Office of Information and Regulatory Affairs, NEOB-10202, (3150-0104), Office of Management and Budget, Washington, DC 20503. If a means used to impose an information collection does not display a currently valid OMB control number, the NRC may not conduct or sponsor, and a person is not required to respond to, the information collection.

1. FACILITY NAME Braidwood Station, Unit 1	2. DOCKET NUMBER 05000456	3. PAGE 1 OF 4
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4. TITLE
Inadequate Protection from Tornado Missiles Identified Due to Non-Conforming Design Conditions

5. EVENT DATE			6. LER NUMBER			7. REPORT DATE			8. OTHER FACILITIES INVOLVED	
MONTH	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REV NO.	MONTH	DAY	YEAR	FACILITY NAME	DOCKET NUMBER
05	25	2016	2016	- 002	- 00	07	19	2016	Braidwood Station, Unit 2	05000457
									FACILITY NAME	DOCKET NUMBER
									N/A	N/A

9. OPERATING MODE **11. THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check all that apply)**

1	<input type="checkbox"/> 20.2201(b)	<input type="checkbox"/> 20.2203(a)(3)(i)	<input type="checkbox"/> 50.73(a)(2)(ii)(A)	<input type="checkbox"/> 50.73(a)(2)(viii)(A)
	<input type="checkbox"/> 20.2201(d)	<input type="checkbox"/> 20.2203(a)(3)(ii)	<input checked="" type="checkbox"/> 50.73(a)(2)(ii)(B)	<input type="checkbox"/> 50.73(a)(2)(viii)(B)
	<input type="checkbox"/> 20.2203(a)(1)	<input type="checkbox"/> 20.2203(a)(4)	<input type="checkbox"/> 50.73(a)(2)(iii)	<input checked="" type="checkbox"/> 50.73(a)(2)(ix)(A)
	<input type="checkbox"/> 20.2203(a)(2)(i)	<input type="checkbox"/> 50.36(c)(1)(i)(A)	<input type="checkbox"/> 50.73(a)(2)(iv)(A)	<input type="checkbox"/> 50.73(a)(2)(x)

10. POWER LEVEL

100	<input type="checkbox"/> 20.2203(a)(2)(ii)	<input type="checkbox"/> 50.36(c)(1)(ii)(A)	<input type="checkbox"/> 50.73(a)(2)(v)(A)	<input type="checkbox"/> 73.71(a)(4)
	<input type="checkbox"/> 20.2203(a)(2)(iii)	<input type="checkbox"/> 50.36(c)(2)	<input type="checkbox"/> 50.73(a)(2)(v)(B)	<input type="checkbox"/> 73.71(a)(5)
	<input type="checkbox"/> 20.2203(a)(2)(iv)	<input type="checkbox"/> 50.46(a)(3)(ii)	<input type="checkbox"/> 50.73(a)(2)(v)(C)	<input type="checkbox"/> 73.77(a)(1)
	<input type="checkbox"/> 20.2203(a)(2)(v)	<input type="checkbox"/> 50.73(a)(2)(i)(A)	<input checked="" type="checkbox"/> 50.73(a)(2)(v)(D)	<input type="checkbox"/> 73.77(a)(2)(i)
	<input type="checkbox"/> 20.2203(a)(2)(vi)	<input checked="" type="checkbox"/> 50.73(a)(2)(i)(B)	<input type="checkbox"/> 50.73(a)(2)(vii)	<input type="checkbox"/> 73.77(a)(2)(ii)
	<input type="checkbox"/> 50.73(a)(2)(i)(C)	<input type="checkbox"/> OTHER	Specify in Abstract below or in NRC Form 366A	

12. LICENSEE CONTACT FOR THIS LER

LICENSEE CONTACT Steven Reynolds, Regulatory Assurance Manager	TELEPHONE NUMBER (Include Area Code) (815) 417-2800
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13. COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT

CAUSE	SYSTEM	COMPONENT	MANU-FACTURER	REPORTABLE TO EPIX	CAUSE	SYSTEM	COMPONENT	MANU-FACTURER	REPORTABLE TO EPIX
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

14. SUPPLEMENTAL REPORT EXPECTED <input type="checkbox"/> YES (If yes, complete 15. EXPECTED SUBMISSION DATE) <input checked="" type="checkbox"/> NO	15. EXPECTED SUBMISSION DATE		
	MONTH	DAY	YEAR
	N/A	N/A	N/A

ABSTRACT (Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines)

On May 25, 2016, during evaluation of protection for Technical Specification (TS) equipment from the damaging effects of tornadoes, Braidwood identified non-conforming conditions in the plant design such that specific TS equipment on both units was considered to not be adequately protected from tornado missiles.

On May 25, 2016 at 1415 Operations declared the affected equipment inoperable, implemented Enforcement Guidance Memorandum (EGM) 15-002, "Enforcement Discretion for Tornado-Generated Missile Protection Noncompliance" and the required compensatory measures, and then declared the affected equipment operable but non-conforming.

The cause of this issue was a lack of clarity and changing requirements during the original licensing of the plants which led to inadequate understanding of the original NRC regulatory guidance.

The corrective actions planned are to complete the EGM 60-day comprehensive compensatory measures to demonstrate a discernable change from its pre-discovery actions, to modify the refueling water storage tank hatches to eliminate the tornado missile vulnerability, and to obtain and implement a license amendment for an analytical solution dispositioning tornado generated missile nonconforming conditions.

NRC FORM 366A
(11-2015)

U.S. NUCLEAR REGULATORY COMMISSION

APPROVED BY OMB: NO. 3150-0104

EXPIRES: 10/31/2018



LICENSEE EVENT REPORT (LER) CONTINUATION SHEET

Estimated burden per response to comply with this mandatory collection request: 80 hours. Reported lessons learned are incorporated into the licensing process and fed back to industry. Send comments regarding burden estimate to the FOIA, Privacy and Information Collections Branch (T-5 F53), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by internet e-mail to Infocollects.Resource@nrc.gov, and to the Desk Officer, Office of Information and Regulatory Affairs, NEOB-10202, (3150-0104), Office of Management and Budget, Washington, DC 20503. If a means used to impose an information collection does not display a currently valid OMB control number, the NRC may not conduct or sponsor, and a person is not required to respond to, the information collection.

1. FACILITY NAME	2. DOCKET NUMBER	3. LER NUMBER		
		YEAR	SEQUENTIAL NUMBER	REV NO.
Braidwood Station, Unit 1	05000456	2016	- 002	- 00

NARRATIVE

A. Plant Operating Conditions Before the Event:

Event Date: May 25, 2016

Unit: 1 Mode: 1 Reactor Power: 100 percent
Unit: 2 Mode: 1 Reactor Power: 100 percent

Unit 1 Reactor Coolant System (RCS) [AB]: Normal operating temperature and pressure
Unit 2 Reactor Coolant System: Normal operating temperature and pressure

No structures, systems or components were inoperable at the start of this event that contributed to the event.

Background NRC Documents

Enforcement Guidance Memorandum (EGM) 15-002, "Enforcement Discretion for Tornado-Generated Missile Protection Noncompliance," provides guidance to exercise enforcement discretion when an operating power reactor licensee does not comply with a plant's current site-specific licensing basis for tornado-generated missile protection. Specifically, discretion would apply to the applicable Technical Specification (TS) Limiting Condition(s) for Operation (LCO) which would require a reactor shutdown or mode change, if a licensee could not meet TS LCO required action(s) within the TS completion time.

Interim Staff Guidance DSS-ISG-2016-01, "Clarification of Licensee Actions in Receipt of Enforcement Discretion Per Enforcement Guidance Memorandum EGM 15-002," provides interim staff guidance (ISG) to provide clarifying guidance to facilitate staff understanding of expectations for consistent oversight associated with implementing enforcement discretion for tornado missile protection noncompliance(s) per EGM 15-002.

Appendix A to DSS-ISG-2016-01 provides guidance for acceptable initial and comprehensive compensatory measures for licensee use in implementing the enforcement discretion outlined in EGM 15-002. The licensee should declare (log) the utilization of EGM 15-002, inform the resident inspector, and enter the issue into the corrective action program. For initial compensatory measures, it is expected that the measures listed are already in place at sites that may be affected by severe weather, such as tornadoes and/or hurricane force winds. The measures provided should be verified as current and readily deployable within a very short timeframe (the shortest timeframe could, in some scenarios, be dictated by a TS 3.0.3 completion time of one hour).

B. Description of Event:

On May 25, 2016, during evaluation of protection for TS equipment from the damaging effects of tornadoes, Braidwood identified non-conforming conditions in the plant design such that specific TS equipment on both units was considered to not be adequately protected from tornado missiles. These included ventilation openings in the wall that separates the non-safety related turbine building and the safety related auxiliary building.

Additionally, the auxiliary feedwater (AF) [BA] diesel exterior exhaust stacks, which extend from the roofline, could be impacted by tornado missiles. While there are analyses on these impacts, they do not use an NRC accepted methodology to evaluate the impact and affects.

Further, the refueling water storage tank (RWST) roof access opening Bilco hatch is fabricated from sheet metal that is not designed to prevent all postulated tornado missiles from entering the tank. The following piping, located

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		YEAR	SEQUENTIAL NUMBER	REV NO.
Braidwood Station, Unit 1	05000456	2016	- 002	- 00

NARRATIVE

inside the RWST, could be impacted by tornado missiles entering the RWST roof access: the six inch RWST recirculation pipe; the three inch overflow pipe; and the twenty-four inch suction pipe.

On May 25, 2016 at 1415, Operations declared the affected equipment inoperable, implemented EGM 15-002 and the required compensatory measures, and then declared the affected equipment operable but non-conforming, as allowed by the EGM and DSS. The TS LCOs and Technical Requirements Manual (TRM) Limiting Conditions for Operation (TLCO) that were entered and exited were for the following equipment: The two Unit 0 A and B trains of control room ventilation [VI], the Unit 1 (Division 11) and Unit 2 (Division 21) train A battery chargers and DC buses [EJ], the Unit 1 and Unit 2 112/114/212/214 ESF inverters [EF], the main control room radiation monitors (OPR31J, OPR32J, OPR33J, OPR34J) [IL], the Unit 1 and Unit 2 RWSTs, the Unit 1 and Unit 2 emergency core cooling system trains, the Unit 1 and Unit 2 containment spray [BE] for both trains, and the Unit 1 and Unit 2 B train (diesel driven) auxiliary feedwater [SJ] pumps. NRC Event Notification (ENS) 51959 was made on May 25, 2016 at 1710 EDT.

This condition is reportable in accordance with 10 CFR 50.73(b)(3)(ii)(B) for any event or condition that results in the nuclear power plant being in an unanalyzed condition that significantly degrades plant safety, and in accordance with 10 CFR 50.73(b)(2)(v)(D) for any event or condition that at the time of discovery could have prevented the fulfillment of the safety function of structures or systems that are needed to mitigate the consequences of an accident. As the issues have been in place per original plant design, this condition existed for a longer period of time than is allowed by TS; therefore, this event is reportable in accordance with 10 CFR 50.73(a)(2)(i)(B) for any operation or condition which was prohibited by TS. Additionally, this event is reportable in accordance with 10 CFR 50.73(a)(2)(ix)(A) for any event or condition that as a result of a single cause could have prevented the fulfillment of a safety function for two or more trains or channels in different systems that are needed to mitigate the consequences of an accident.

C. Cause of Event

The cause of this issue was a lack of clarity and changing requirements during the original licensing of the plants which led to inadequate understanding of the original NRC regulatory guidance.

D. Safety Consequences:

This condition had no actual safety consequences impacting plant or public safety since Braidwood Station did not experience a tornado missile event.

During a postulated design basis tornado, this could have resulted in the loss of one or more of the equipment listed above under Description of Event, and result in the loss of safety function of one or more systems.

EGM 15-002, in providing the basis for granting the enforcement discretion stated that, in general, tornado missile scenarios that may lead to core damage are very low probability events, because safety-related systems, structures and components (SSCs) are typically designed to withstand the effects of tornadoes. For a tornado missile induced scenario to occur, a tornado would have to hit the site and result in the generation of missiles that would hit and fail vulnerable, unprotected safety related equipment and/or unprotected safety related subcomponents in a manner that is non-repairable and non-recoverable. In addition, because plants are designed with redundancy and diversity, the tornado missiles would have to affect multiple trains of safety systems and/or means of achieving safe shutdown.

EMG 15-002 states that the NRC completed a generic risk analysis of potential tornado missile protection non-compliances to examine the risk significance of these scenarios. The generic nature of this analysis did not afford

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NARRATIVE

the staff the capability to assess plant-specific tornado missile protections which likely exist at many reactors that would result in lower risk determinations, and it did not consider the plant-specific nature of the non-compliances or the redundancies of SSCs. The generic analysis assumed that core damage would occur if a tornado hit a plant located in the most active tornado region in the country and that it caused a tornado-generated missile to fail all emergency core cooling equipment at the plant with no ability to recover.

Further, the study did not account for a number of conservatisms. For example, whereas the study assumed the failure of redundant systems due to tornado generated missiles, actual spatial configurations of redundant systems at a plant could lower the probability of complete system failures as a result of tornado generated missiles. Additionally, some tornado generated missiles may not cause system failures at all or may cause failures that are repairable or recoverable within a reasonable time frame.

In summary, EGM 15-002 states that the generic bounding risk analysis performed by the NRC concluded that this issue is of low risk significance. Therefore, enforcement discretion until June 10, 2018, will not impose significant additional risk to public health and safety.

E. Corrective Actions:

Immediate Actions Completed

1. Abnormal Operating Procedure addressing tornadoes and high winds was revised to add additional guidance for performing actions in the event of a tornado watch or warning.
2. A description of the nonconforming SSCs and associated compensatory measures has been added to the Operations turnovers, and a briefing discussing these actions was performed during each shift turnover briefing.
3. An Operations Standing Order and an associated read and sign were created to document all Operations personnel understanding of the additional requirements.
4. Log entries were made documenting the inoperability and subsequent transition to operable but nonconforming. The initial briefing actions were also completed and logged.

Corrective Actions Planned

1. Complete the EGM 60-day comprehensive compensatory measures to demonstrate a discernable change from its pre-discovery actions.
2. Modify the RWST hatches to eliminate the tornado missile vulnerability.
3. Obtain and implement a license amendment for an analytical solution dispositioning tornado generated missile nonconforming conditions.

F. Previous Occurrences:

There have been no previous Licensee Event Reports at Braidwood on this issue.

G. Component Failure Data:

<u>Manufacturer</u>	<u>Nomenclature</u>	<u>Model</u>	<u>Mfg. Part Number</u>
N/A	N/A	N/A	N/A