



Entergy Nuclear Operations, Inc.  
Palisades Nuclear Plant  
27780 Blue Star Memorial Highway  
Covert, MI 49043  
Tel 269 764 2000

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**Charles F. Arnone**  
Site Vice President

PNP 2017-024

May 24, 2017

10 CFR 50.73

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

**SUBJECT:** Inadequate Protection from Tornado Missiles Identified Due to  
Nonconforming Design Conditions

Palisades Nuclear Plant  
Docket 50-255  
License No. DPR-20

Dear Sir or Madam:

Entergy Nuclear Operations, Inc., submits the enclosed Licensee Event Report, 2017-001-00, in accordance with 10 CFR 50.73 for the Palisades Nuclear Plant. This report details nonconforming design conditions associated with protection against potential tornado missile impact.

This letter contains no new commitments and no revisions to existing commitments.

Sincerely,

A handwritten signature in black ink, appearing to read "Arnone", written over the word "Sincerely,".

CFA/tad

Attachment: LER 2017-001-00, Inadequate Protection from Tornado Missiles Identified  
Due to Nonconforming Design Conditions

CC Administrator, Region III, USNRC  
Project Manager, Palisades, USNRC  
Resident Inspector, Palisades, USNRC

**ATTACHMENT**

**LER 2017-001-00**

**INADEQUATE PROTECTION FROM TORNADO MISSILES IDENTIFIED DUE TO  
NONCONFORMING DESIGN CONDITIONS**

**3 Pages Follow**

NRC FORM 366 (04-2017)		U.S. NUCLEAR REGULATORY COMMISSION			APPROVED BY OMB: NO. 3150-0104		EXPIRES: 03/31/2020		
<b>LICENSEE EVENT REPORT (LER)</b> (See Page 2 for required number of digits/characters for each block)									
(See NUREG-1022, R.3 for instruction and guidance for completing this form <a href="http://www.nrc.gov/reading-rm/doc-collections/nuregs/staff/sr1022/r3/">http://www.nrc.gov/reading-rm/doc-collections/nuregs/staff/sr1022/r3/</a> )									
1. FACILITY NAME <b>PALISADES NUCLEAR PLANT</b>					2. DOCKET NUMBER <b>05000255</b>		3. PAGE <b>1 OF 3</b>		
4. TITLE <b>Inadequate Protection from Tornado Missiles Identified Due to Nonconforming Design Conditions</b>									
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 <b>05000</b>
03	29	2017	2017	001	00	05	24	2017	FACILITY NAME <b>05000</b>
9. OPERATING MODE  <b>1</b>			11. THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check all that apply)						
			<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  <b>70%</b>			<input type="checkbox"/> 20.2203(a)(2)(ii)	<input type="checkbox"/> 50.36(c)(1)(ii)(A)	<input checked="" 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 checked="" 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 checked="" 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 <b>Jeff Hardy, Regulatory Assurance Manager</b>							TELEPHONE NUMBER (Include Area Code) <b>269-764-2011</b>		
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	Y					
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				
ABSTRACT (Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines)  <p>On March 29, 2017, during an evaluation of protection of Technical Specification (TS) equipment from the damaging effects of tornados, nonconforming conditions were identified in the plant design. Specifically, TS equipment did not meet current design basis for protection against potential tornado missile impact. Identified components/systems were declared inoperable and NRC Enforcement Guidance Memorandum (EGM) 15-002, "Enforcement Discretion for Tornado Generated Missile Protection Noncompliance," was implemented. Initial compensatory measures were implemented, per the guidance of NRC Interim Staff Guidance DSS-ISG-2016-01 Appendix A, within the time allowed by the applicable Limiting Conditions for Operation (LCOs) and the associated systems were then declared operable but nonconforming.</p> <p>The six systems, containing TS required equipment, did not meet current design basis for protection against potential tornado missile impact. Credible tornado missile impacts could affect the following systems; Service Water, Fuel Oil, Emergency Diesel Generators, Auxiliary Feedwater, Component Cooling Water and Control Room Ventilation Filtration.</p> <p>Comprehensive compensatory measures will be implemented in approximately 60 days of discovery, per the guidance of NRC Interim Staff Guidance DSS-ISG-2016-01 Appendix A.</p> <p>Due to the historical nature of the issue, a specific cause for the identified vulnerabilities was not determined.</p>									

**LICENSEE EVENT REPORT (LER)  
CONTINUATION SHEET**

(See NUREG-1022, R.3 for instruction and guidance for completing this form  
<http://www.nrc.gov/reading-rm/doc-collections/nuregs/staff/sr1022/r3/>)

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 Information Services Branch (T-2 F43), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by e-mail to [Infocollects.Resource@nrc.gov](mailto: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		
PALISADES NUCLEAR PLANT	05000-255	YEAR	SEQUENTIAL NUMBER	REV NO.
		2017	- 001	- 00

**NARRATIVE****BACKGROUND**

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) that would require a reactor shutdown or mode change in the event 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 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 tornados and/or hurricane force winds. The measures should be verified as current and readily deployable within a very short timeframe.

**EVENT DESCRIPTION**

On March 29, 2017, during an evaluation of protection of TS equipment from the damaging effects of tornados, nonconforming conditions were identified in the plant design. Specifically, TS equipment did not meet current design basis for protection against potential tornado missile impact. In some systems, both trains of TS equipment are impacted, potentially resulting in the loss of safety functions. The plant was in Mode 1 at approximately 70% reactor power. No Structures, Systems or Components (SSCs) were inoperable when the conditions were identified that contributed to the event.

Six systems containing TS equipment are affected to the extent that an impact on operability was credible. Potential tornado missile impacts could affect the following systems:

- Service Water (SW) and Fuel Oil (FO) - Ventilator openings in the structure housing portions of the SW and FO systems provide a straight-line path to TS equipment that is part of the systems.
- Emergency Diesel Generators (EDGs) - The vent lines for the fuel oil day tanks of the EDGs are exposed and could cause a loss of fuel oil supply to the EDGs if struck and crimped.
- Auxiliary Feedwater (AFW) - The steam supply relief valves for the steam turbine driven AFW pump downstream of the steam supply valve are located adjacent to the turbine building siding which is not designed for tornado missile impact. A potential tornado missile strike of either relief valve could cause a loss of steam supply to the pump.
- Component Cooling Water (CCW) - A wall of the CCW surge tank room may not be adequate protection for the surge tank. A calculation demonstrating the adequacy of the wall could not be located.
- Control Room Ventilation (CRV) Filtration - The air intake piping for the CRV system is exposed and could cause a loss of air intake to the control room envelope if struck and crimped.



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PALISADES NUCLEAR PLANT	05000-255	YEAR	SEQUENTIAL NUMBER	REV NO.
		2017	- 001	- 00

**NARRATIVE****CAUSE OF THE EVENT**

Due to the historical nature of the issue, a specific cause for the identified vulnerabilities was not determined.

**ASSESSMENT OF SAFETY CONSEQUENCES**

No actual safety consequence occurred, as Palisades did not experience an actual tornado missile event. As stated in the NRC Enforcement Guidance Memorandum, 15-002, the basis for exercising enforcement discretion is a result of a generic risk analysis performed by the Office of Nuclear Reactor Regulation (NRR), Division of Risk Assessment (DRA). The assessment documents a conservative, bounding-type analysis of the risk significance for plant facilities that may not be in compliance with their tornado missile protection licensing basis. 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. Given this conservative assumption, the core-damage frequency (CDF) associated with tornado missile related to the non-compliances are well below CDFs requiring immediate regulatory action. 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, the generic bounding risk analysis performed by NRR DRA has concluded that this issue is of low risk significance. Therefore, enforcement discretion will not impose significant additional risk to public health and safety.

**CORRECTIVE ACTIONS****Corrective Actions Completed:**

All applicable TS equipment and systems were declared inoperable. Initial compensatory measures were implemented, per the guidance of DSS-ISG-2016-01 Appendix A, within the time allowed by the applicable LCOs. Subsequently, the affected TS equipment and systems were declared operable but nonconforming.

To establish a heightened level of station awareness and preparedness relative to identified tornado missile vulnerabilities, a description of the nonconforming SSCs and the associated compensatory measures were documented in operations standing orders log.

**Corrective Actions Planned:**

Establish comprehensive compensatory measures in approximately 60 days of discovery, per the guidance of NRC Interim Staff Guidance DSS-ISG-2016-01 Appendix A.

**PREVIOUS SIMILAR EVENTS**

None.