



May 23, 2005

NRC-05-056
10 CFR 50.73

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

Kewaunee Nuclear Power Plant
Docket 50-305
License No. DPR-43

Reportable Occurrence 2005-005-00

In accordance with the requirements of 10 CFR 50.73, "Licensee Event Report System," the attached Licensee Event Report (LER) for reportable occurrence 2005-005-00 is being submitted.

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

Michael G. Gaffney
Site Vice-President, Kewaunee Nuclear Power Plant
Nuclear Management Company, LLC

Enclosure (1)

cc: Administrator, Region III, USNRC
Senior Resident Inspector, Kewaunee, USNRC
INPO Records Center

IE22

ENCLOSURE 1
LICENSEE EVENT REPORT (LER)
2005-005-00

4 pages follow

LICENSEE EVENT REPORT (LER)

(See reverse for required number of digits/characters for each block)

Estimated burden per response to comply with this mandatory collection request: 50 hours. Reported lessons learned are incorporated into the licensing process and fed back to industry. Send comments regarding burden estimate to the Records and FOIA/Privacy Service Branch (T-5 F52), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by internet e-mail to infocollects@nrc.gov, and to the Desk Officer, Office of Information and Regulatory Affairs, NEOB-10202, (3150-0066), 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.

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|--|--------------------------------------|---------------------------|
| FACILITY NAME (1) Kewaunee Nuclear Power Plant | DOCKET NUMBER (2) 05000305 | PAGE (3) 1 of 4 |
|--|--------------------------------------|---------------------------|

TITLE (4)
Emergency Diesel Generator Exhaust Ductwork Not Adequately Protected from Potential Tornado Winds & Missiles

| EVENT DATE (5) | | | LER NUMBER (6) | | | REPORT DATE (7) | | | OTHER FACILITIES INVOLVED (8) | | |
|---------------------------|-----|---|----------------|--------------------|--------|-----------------|-----|----------------------|-------------------------------|---|--|
| MO | DAY | YEAR | YEAR | SEQUENTIAL NUMBER | REV NO | MO | DAY | YEAR | FACILITY NAME | DOCKET NUMBER | |
| 03 | 24 | 2005 | 2005 | -- 005 -- | 00 | 05 | 23 | 2005 | | | |
| OPERATING MODE (9) | | THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR: (Check all that apply) (11) | | | | | | | | | |
| N | | 20.2201(b) | | 20.2203(a)(3)(ii) | | X | | 50.73(a)(2)(ii)(B) | | 50.73(a)(2)(ix)(A) | |
| POWER LEVEL (10) | | 20.2201(d) | | 20.2203(a)(4) | | | | 50.73(a)(2)(iii) | | 50.73(a)(2)(x) | |
| 000 | | 20.2203(a)(1) | | 50.36(c)(1)(i)(A) | | | | 50.73(a)(2)(iv)(A) | | 73.71(a)(4) | |
| | | 20.2203(a)(2)(i) | | 50.36(c)(1)(ii)(A) | | | | 50.73(a)(2)(v)(A) | | 73.71(a)(5) | |
| | | 20.2203(a)(2)(ii) | | 50.36(c)(2) | | | | 50.73(a)(2)(v)(B) | | OTHER Specify in Abstract below or in NRC Form 366A | |
| | | 20.2203(a)(2)(iii) | | 50.46(a)(3)(ii) | | | | 50.73(a)(2)(v)(C) | | | |
| | | 20.2203(a)(2)(iv) | | 50.73(a)(2)(i)(A) | | | | 50.73(a)(2)(v)(D) | | | |
| | | 20.2203(a)(2)(v) | | 50.73(a)(2)(i)(B) | | | | 50.73(a)(2)(vii) | | | |
| | | 20.2203(a)(2)(vi) | | 50.73(a)(2)(i)(C) | | | | 50.73(a)(2)(viii)(A) | | | |
| | | 20.2203(a)(3)(i) | | 50.73(a)(2)(ii)(A) | | | | 50.73(a)(2)(viii)(B) | | | |

LICENSEE CONTACT FOR THIS LER (12)

| | |
|--|--|
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|--|--|

COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)

| CAUSE | SYSTEM | COMPONENT | MANU-FACTURER | REPORTABLE TO EPIX | CAUSE | SYSTEM | COMPONENT | MANU-FACTURER | REPORTABLE TO EPIX |
|-------|--------|-----------|---------------|--------------------|-------|--------|-----------|---------------|--------------------|
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SUPPLEMENTAL REPORT EXPECTED (14)

| | | | | | |
|--|-----------------------------|--------------------------------------|-------|-----|------|
| <input checked="" type="checkbox"/> YES (If yes, complete EXPECTED SUBMISSION DATE). | <input type="checkbox"/> NO | EXPECTED SUBMISSION DATE (15) | MONTH | DAY | YEAR |
| | | | 09 | 30 | 2005 |

ABSTRACT

On March 24, 2005, with unit in the refueling shutdown condition, a walk-down was being conducted in the Kewaunee Nuclear Power Plant (KNPP) Turbine Building, as part of an evaluation of the Turbine Building response to design basis tornado winds. Sections of sheet metal panel siding on the Turbine Building are designed to blow out / blow in due to tornado wind loading, as given in Updated Safety Analysis Report (USAR) Appendix B. However, loss of this siding would expose the Class 3 portion of the A and B Emergency Diesel Generator (EDG) exhaust ductwork to tornado wind loads. The response of the sheet metal panels would be that the ductwork could be subjected to full design basis tornado force. Exposure to tornado winds would likely result in deformation of the ductwork for each EDG. On April 19, 2005, during the evaluation to determine a resolution to the tornado wind EDG ductwork deformation problem, it was determined that the EDG exhaust ductwork was also susceptible to turbine and tomado missiles. Appendix B of the USAR evaluates turbine and tornado missiles for Class 1 portion of the EDG. It does not address how the Class 3 structures and components associated with the EDG could impact its operation if impacted by a missile. At the time of discovery of these issues, the EDGs were not required to be operable per Technical Specifications. Deformation of the EDG exhaust ducts could result in some reduction of EDG capacity, due to postulated increase in exhaust backpressure. The apparent cause relative to this condition is the original design of the plant, which did not take these effects into account. Design Change Request DCR-3582 has been initiated to reinforce or replace the guides for the EDG exhaust ducts, and reinforce existing structural steel to carry the guide loads. This modification will be completed prior to unit re-start. A probabilistic evaluation of tornado missiles, utilizing the TORMIS computer program, will be performed. An evaluation of the effects of turbine missiles on the 'B' EDG exhaust duct will also be performed.

LICENSEE EVENT REPORT (LER)
TEXT CONTINUATION

| FACILITY NAME (1) | DOCKET NUMBER (2) | LER NUMBER (6) | | | PAGE (3) |
|------------------------------|-------------------|----------------|-------------------|-----------------|----------|
| Kewaunee Nuclear Power Plant | 05000305 | YEAR | SEQUENTIAL NUMBER | REVISION NUMBER | 2 of 4 |
| | | 2005 | -- 005 | -- 00 | |

TEXT (If more space is required, use additional copies of NRC Form 366A) (17)

Event Description

On March 24, 2005 with unit in the refueling shutdown condition, a walk-down was being conducted in the Kewaunee Nuclear Power Plant (KNPP) Turbine Building as part of an evaluation of the Turbine Building response to design basis tornado winds. The Turbine Building is a mixed classification building, according to Appendix B, Section B.2 of the KNPP Updated Safety Analysis Report (USAR). In that regard, the Turbine Building has to be able to withstand design basis tornado wind conditions without jeopardizing the Class 1 equipment housed in the building.

Through study of design information for KNPP and consultation with a recognized industry expert in tornados (including response of structures to tornados), it has been determined that the Turbine Building response to design basis tornado winds would not jeopardize the Class 1 equipment housed in the building. Sections of sheet metal panel [PL] siding on the KNPP Turbine Building are designed to blow out / blow in due to tornado wind loading, as given in USAR Appendix B. However, loss of this siding would expose the Class 3 portion of the 'A' and 'B' Emergency Diesel Generator (EDG) [DG] exhaust ductwork [DUCT] to tornado wind loads. The response of the sheet metal panels in the Turbine Building (clearing in reaction to the approaching tornado to vent the building) would likely be such that this Class 3 EDG exhaust ductwork (each located just inboard of the Turbine Building east wall) could be subjected to full design basis tornado force winds (300 mph plus 60 mph translational speed for a total of 360 mph). Exposure to winds of that magnitude would likely result in deformation of the exhaust ductwork for each EDG at the anchor [SPT] located between the Turbine Building east wall and the Turbine Building crane rails. This would also likely result in deformation of the guide channel beams where the exhaust ductwork passes through the Turbine Building roof.

On April 19, 2005, during the evaluation to determine a resolution to the tornado wind EDG ductwork deformation problem, it was determined that the EDG exhaust ductwork was also susceptible to turbine and tornado missiles. Appendix B of the Updated Safety Analysis Report (USAR) evaluates turbine and tornado missiles for Class 1 portion of the EDG. It does not address how the Class 3 structures and components associated with the EDG could impact its operation, if impacted by a missile.

At the time of discovery of these issues, the EDGs were not required to be operable per Technical Specifications, and power to the plant was being supplied from the Reserve and Tertiary Auxiliary Transformers [XFMR].

This report does not identify a Safety System Functional Failure.

Event Analysis and Safety Significance

This condition is being reported in accordance with 10CFR50.73(a)(2)(ii)(B), "Any event or condition that resulted in the nuclear plant being in an unanalyzed condition that significantly degraded plant safety".

The function of EDG exhaust ducts is to vent EDG exhaust gases to the atmosphere. They are constructed of ¼" thick carbon steel plate and are supported by a series of guides, springs, and anchors. The function of the guides is to provide lateral support to the duct. Each duct is free to move vertically at the guides and spring supports. The duct is vertically supported at the anchors and spring supports.

LICENSEE EVENT REPORT (LER)
TEXT CONTINUATION

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|------------------------------|-------------------|----------------|-------------------|-----------------|----------|
| FACILITY NAME (1) | DOCKET NUMBER (2) | LER NUMBER (6) | | | PAGE (3) |
| Kewaunee Nuclear Power Plant | 05000305 | YEAR | SEQUENTIAL NUMBER | REVISION NUMBER | 3 of 4 |
| | | 2005 | -- 005 -- | 00 | |

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USAR Appendix B Section B.9.1 discusses the analysis performed for turbine missile effects at KNPP. The focus of the text contained in the USAR is on Class I structures and components. The USAR makes little mention of Class 3 structures and components, and does not specifically address the EDG exhaust ductwork. It has been determined that the EDG exhaust ductwork was not considered in the analysis. Turbine missiles affect only the 'B' EDG exhaust duct, since it is physically located directly opposite the #1 Low Pressure Turbine.

Cause

The condition whereby the EDG exhaust ductwork was not adequately protected from the effects of tornado winds and missiles has existed since initial operation of KNPP. The apparent cause relative to this condition is the original design of the plant did not take these effects into account.

Corrective Action

1. Complete Design Change Request DCR-3582 (EDG Exhaust Duct Reinforcement for Tornado Wind Loading).

The 'A' and 'B' EDG exhaust ducts are located immediately inside of the east wall of the Turbine Building from approximately EL. 608'-4" up to EL. 700'. The 'A' EDG exhaust line is located on the north end of the east Turbine building wall adjacent to column line 9. The 'B' EDG exhaust line is located adjacent to the east Turbine Building wall between column lines 5 and 6. Each duct is supported laterally by 3 guides and two anchor supports that are strategically placed along their lengths. Also, two spring cans support the duct vertically.

Detailed analyses of the existing ducts, duct supports and supporting structural steel were performed for the tornado wind loading. The results of the analyses documented concluded that a number of modifications are required to ensure structural integrity of the exhaust duct and its supporting systems. More specifically, two guides on each duct along with one structural steel member for the south duct will require modification to increase their strength.

The design change will be completed prior to unit re-start.

2. Perform a probabilistic evaluation of tornado missiles.

The TORMIS computer program develops the probability of tornado missiles striking the modeled plant structures and other targets, using probability techniques. The NRC, in a Safety Evaluation Report dated October 26, 1983, concluded that TORMIS is an acceptable approach for demonstrating compliance with 10 CFR 50 Appendix A General Design Criteria 2, regarding protection of safety-related plant features from the effects of tornado and high wind generated missiles.

The results of the TORMIS evaluation will be provided in a supplement to this LER.

3. Perform an evaluation of the effects of turbine missiles on the 'B' EDG exhaust duct. The results of this evaluation will be provided in a supplement to this LER.

LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

| FACILITY NAME (1) | DOCKET NUMBER (2) | LER NUMBER (6) | | | PAGE (3) |
|------------------------------|-------------------|----------------|-------------------|-----------------|----------|
| | | YEAR | SEQUENTIAL NUMBER | REVISION NUMBER | |
| Kewaunee Nuclear Power Plant | 05000305 | 2005 | -- 005 | -- 00 | 4 of 4 |

TEXT (If more space is required, use additional copies of NRC Form 366A) (17)

Previous Similar Events

None.