

WOLF CREEK

NUCLEAR OPERATING CORPORATION

May 31, 2017

Stephen L. Smith
Plant Manager

WO 17-0046

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

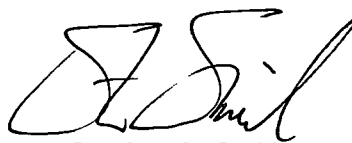
Subject: Docket No. 50-482: Licensee Event Report 2017-002-00, "Tornado Missile Vulnerabilities Result in Condition Prohibited by Technical Specifications"

To Whom It May Concern:

The enclosed Licensee Event Report (LER) 2017-002-00 is being submitted pursuant to 10 CFR 50.73(a)(2)(i)(B), 10 CFR 50.73(a)(2)(ii)(B), 10 CFR 50.73(a)(2)(v)(A), and 10 CFR 50.73(a)(2)(v)(D).

This letter contains no commitments. If you have any questions concerning this matter, please contact me at (620) 364-4093, or Cynthia R. Hafenstine (620) 364-4204.

Sincerely,



Stephen L. Smith

SLS/rlt

Enclosure

cc: K. M. Kennedy (NRC), w/e
B. K. Singal (NRC), w/e
N. H. Taylor (NRC), w/e
Senior Resident Inspector (NRC), w/e

IEZZ
NRR



LICENSEE EVENT REPORT (LER)

(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
<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, 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 Wolf Creek Generating Station | 2. DOCKET NUMBER 05000 482 | 3. PAGE 1 OF 4 |
|--|--------------------------------------|--------------------------|

4. TITLE
Tornado Missile Vulnerabilities Result in Condition Prohibited by Technical Specifications

| 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 |
| 04 | 05 | 2017 | 2017 | 002 | 00 | 05 | 31 | 2017 | FACILITY NAME | DOCKET NUMBER 05000 |
| | | | | | | | | | FACILITY NAME | DOCKET NUMBER 05000 |

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 type="checkbox"/> 50.73(a)(2)(ix)(A) |
| | <input type="checkbox"/> 20.2203(a)(2)(f) | <input type="checkbox"/> 50.36(c)(1)(f)(A) | <input type="checkbox"/> 50.73(a)(2)(iv)(A) | <input type="checkbox"/> 50.73(a)(2)(x) |
| 100 | <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 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 Cynthia R. Hafenstine, Manager Nuclear and Regulatory Affairs | TELEPHONE NUMBER (Include Area Code) (620) 364-4204 |
|---|--|

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

On April 5, 2017, Wolf Creek Generating Station (WCGS) was in Mode 1 at 100 percent power. During evaluation of protection for safety-related equipment from the damaging effects of tornados, WCGS personnel determined that safety-related fuel oil transfer lines inside the Diesel Generator Building could be damaged if tornado generated missiles struck the non-safety related truck connections to these transfer lines. As these safety-related transfer lines are required to supply fuel to the Emergency Diesel Generators (EDGs) from the fuel oil storage tank, Operations declared both of the EDGs inoperable. On April 5, 2017, at 1632 Central Daylight Time, an 8-hour, non-emergency report to the Nuclear Regulatory Commission (NRC) (reference NRC Event Notification Number 52666) was made in accordance with 10 CFR 50.72. Compensatory measures were implemented consistent with Enforcement Guidance Memorandum (EGM) 15-002, "Enforcement Discretion for Tornado-Generated Missile Protection Noncompliance." The EDGs were then declared operable but non-conforming.

These tornado missile vulnerabilities existed since the original plant construction. Immediate compensatory measures included verification that the severe weather procedures were up-to-date, ensuring that Operations personnel were current on their training to these procedures, and implementing measures to heighten station awareness until the vulnerabilities had been corrected. These vulnerabilities have now been permanently eliminated.



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

(See NUREG-1022, R.3 for instruction and guidance for completing this form
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|---|--------------------------------|---------------|--------------------------|---------------|
| 1. FACILITY NAME Wolf Creek Generating Station | 2. DOCKET NUMBER 05000- 482 | 3. LER NUMBER | | |
| | | YEAR 2017 | SEQUENTIAL NUMBER 002 | REV NO. 00 |

NARRATIVE

PLANT CONDITIONS PRIOR TO EVENT

Mode -- 1
Power -- 100%
No structures, systems, or components (SSCs) were inoperable at the start of this event which contributed to this condition.

BACKGROUND DOCUMENTS

Nuclear Regulatory Commission (NRC) 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.

NRC 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.

DESCRIPTION OF EVENT

Wolf Creek Generating Station (WCGS) has 2 emergency diesel generators (EDGs) [EIS Codes: EK, DG] contained in the Seismic Category I Diesel Generator Building [EIS Code: NB]. Each EDG provides emergency AC power to its associated Class 1E electrical bus [EIS Codes: EB, BU] to maintain cold shutdown and to mitigate the consequences of a design basis accident (DBA) whenever offsite power sources are unavailable. The configuration of both trains of EDG and support equipment are essentially the same. Each EDG has a day tank located in the Diesel Generator Building which contains approximately one hour of fuel, and a storage tank located below grade which provides enough fuel to supply that EDG for continuous full-load operation for seven days [EIS Code: DC]. A transfer pump is provided inside each storage tank. This pump supplies fuel from the storage tank to the day tank through a transfer line. This transfer line is a safety-related (SR) 2" Schedule 80 carbon steel pipe located entirely within the Diesel Generator Building. However, this transfer line has a non-safety related (NSR) truck connection which penetrates one wall of the Diesel Generator Building approximately 8 inches to the outside environment. The function of the truck connection is to provide a pathway to pump out the storage tank, if necessary, using the transfer pump as the motive force.



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| | | YEAR 2017 | SEQUENTIAL NUMBER 002 | REV NO. 00 |

NARRATIVE

On April 5, 2017, during the evaluation of tornado missile protection of SR equipment, WCGS personnel identified an unanalyzed condition related to the truck connections to the fuel oil transfer lines. The NSR truck connections penetrate the wall of the Diesel Generator Building to the outside environment, and are not protected from tornado missiles. It was discovered that tornado missiles could strike the NSR truck connections in such a way as to cause damage to the SR transfer lines inside the Diesel Generator Building. There is currently no analysis demonstrating that if a tornado missile were to strike one of the NSR truck connections the SR transfer line, to which that truck connection is attached, would still be able to perform the function of allowing fuel oil to be transferred from the storage tank to the day tank. In that case, the associated EDG would be incapable of performing its safety function of mitigating the effects of a DBA and allowing the plant to achieve safe shutdown conditions in the event of a loss of offsite power.

At 1400 Central Daylight Time (CDT), on April 5, 2017, both EDGs were declared inoperable due to the potential tornado vulnerability. WCGS entered TS LCO 3.8.1, Conditions B (one EDG inoperable) and F (two EDGs inoperable). At 1445 CDT, initial compensatory measures were put in place consistent with EGM 15-002. These included verifying procedures related to severe weather and FLEX support are current and readily deployable, ensuring that training was current for those procedures, and taking measures to establish a heightened level of station awareness and preparedness relative to the tornado vulnerability. Upon completion of the initial compensatory measures, both EDGs were considered operable but non-conforming. TS LCO 3.8.1 Conditions B and F were exited at this time, within their required action completion times. At 1632 CDT, an 8-hour, non-emergency notification to the NRC was completed (event notice #52666) for the unanalyzed condition.

BASIS FOR REPORTABILITY

This condition is reportable as required by:

- 10 CFR 50.73(a)(2)(i)(B) for a condition that is prohibited by Technical Specifications.
- 10 CFR 50.73(a)(2)(ii)(B) for an event or condition that results in the plant being in an unanalyzed condition that significantly degrades plant safety.
- 10 CFR 50.73(a)(2)(v)(A) for a condition that at the time of discovery could have prevented the fulfillment of a safety function of structures or systems needed to shut down the reactor and maintain it in a safe shutdown condition.
- 10 CFR 50.73(a)(2)(v)(D) for a condition that at the time of discovery could have prevented the fulfillment of a safety function of structures or systems needed to mitigate the consequences of an accident.

CAUSE OF EVENT

This condition is an original plant design legacy issue. Due to the historical nature of this vulnerability, a specific cause has not been identified.

CORRECTIVE ACTIONS

These vulnerabilities have been permanently eliminated by the completion of design change package 15264.



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NARRATIVE

SAFETY SIGNIFICANCE

As documented in EGM 15-002, tornado missile scenarios that may lead to core damage are very low probability events because SR SSCs are typically designed to withstand effects of tornados. 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 SR equipment, and/or unprotected SR 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.

The NRC has completed a generic risk analysis of potential tornado missile protection noncompliances to examine the risk significance of these scenarios. This assessment documents a conservative, bounding-type analysis of the risk significance for plant facilities. 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 staff's study established that the core damage frequency (CDF) associated with tornado missile-related noncompliances are well below CDFs requiring immediate regulatory action. In summary, the generic bounding risk analysis performed by the NRC concluded that this issue is of low risk significance.

During a postulated design basis tornado, the conditions documented could have resulted in a loss of safety function for the EDGs. The EDGs are used to mitigate the effects of a loss of offsite power by providing an emergency AC power source. WCGS also has 3 Station Blackout Diesel Generators (SBO DGs) which are available to provide reliable AC power to one of the Class 1E busses. Though the SBO DGs are NSR, they (and all equipment necessary to operate them) are protected by missile shields. In the highly unlikely event that tornado conditions caused a loss of offsite power, and made both EDGs non-functional, the SBO DGs would have been available to provide emergency AC power to one Class 1E bus to complete and maintain safe shutdown of the reactor. As WCGS has not experienced an actual tornado missile event, this condition had no actual safety consequences impacting plant or public safety. The vulnerabilities of the truck connections to tornado missile strikes have been eliminated with the completion of design change package 15264. Therefore, this condition had a very low safety significance.

OPERATING EXPERIENCE/PREVIOUS EVENTS

None