

# WOLF CREEK

NUCLEAR OPERATING CORPORATION

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U. S. Nuclear Regulatory Commission  
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- References: 1) NRC Regulatory Issue Summary 2015-06, Tornado Missile Protection, dated June 10, 2015 (ADAMS Accession Number ML15020A419)
- 2) NRC Memorandum, Enforcement Guidance Memorandum 15-002, Enforcement Discretion for Tornado-Generated Missile Protection Noncompliance, dated June 10, 2015 (ADAMS Accession Number ML15111A269)
- 3) NRC Memorandum, Enforcement Guidance Memorandum 15-002, Revision 1, Enforcement Discretion for Tornado-Generated Missile Protection Noncompliance, dated February 7, 2017 (ADAMS Accession Number ML16355A286)
- 4) NRC Interim Staff Guidance DSS-ISG-2016-01, Clarification of Licensee Actions in Receipt of Enforcement Discretion per Enforcement Guidance Memorandum EGM 15-002, Enforcement Discretion for Tornado-Generated Missile Protection Noncompliance," Revision 1, dated November 2017 (ADAMS Accession ML17128A344)

Subject: Docket No. 50-482: Request to Extend Enforcement Discretion Provided in Enforcement Guidance Memorandum 15-002 for Tornado-Generated Missile Protection Non-Conformances Identified in Response to Regulatory Issue Summary 2015-06, "Tornado Missile Protection"

## To Whom It May Concern:

In Reference 1, the Nuclear Regulatory Commission (NRC) issued Regulatory Issue Summary (RIS) 2015-06, "Tornado Missile Protection," to, in part, remind licensees of the need to conform to their plants' current, site-specific licensing basis for tornado-generated missile protection.

In Reference 2, the NRC provided in Enforcement Guidance Memorandum (EGM) 2015-002 guidance to exercise enforcement discretion when an operating power reactor licensee does not comply with its plant's current site specific licensing basis for tornado-generated missile protection. It was noted that the NRC would exercise enforcement discretion only when a licensee implements initial compensatory measures to provide additional protection, followed by more comprehensive, long-term compensatory measures implemented within 60 days of issue discovery. The enforcement discretion would expire three years after issuance of RIS 2015-06, dated June 10, 2015, for plants of a higher tornado risk (Group A Plants) and five years after RIS issuance for plants of a lower tornado risk (Group B Plants). The EGM categorized Wolf Creek Generating Station (WCGS) as a Group A plant.

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Per Reference 3, the NRC issued Revision 1 of EGM 15-002 to state that licensees may request extension to their enforcement discretion expiration date if proper justification is provided. This extension would be granted on a case-by-case basis and remain in place until compliance is achieved. In accordance with Reference 3, Wolf Creek Nuclear Operating Corporation (WCNOC) hereby requests that the NRC extend the expiration date for the period of enforcement discretion for WCGS from June 10, 2018, to June 10, 2020.

WCNOC has completed a comprehensive assessment for WCGS and has identified non-conforming conditions regarding tornado missile protection requirements that affect the operability of structures, systems or components addressed in the WCGS Technical Specifications. A summary of the assessment methodology, scope, and results is provided in the attachment to this letter. Further, the non-conforming conditions have been documented in the WCNOC corrective action program in accordance with plant procedures, and all required notifications have been completed as discussed in the attachment.

Consistent with the guidance provided in NRC Interim Staff Guidance DSS-ISG-2016-01 (Reference 4), initial and comprehensive compensatory measures have been implemented for the WCGS non-conforming conditions, as described in the attachment. Additionally, a collective review of the comprehensive compensatory measures currently in place, including expected operator actions in response to severe weather and a subsequent loss of offsite power, has been performed to confirm that the site can perform these compensatory measures and operator actions in an effective manner. These comprehensive compensatory measures will remain in place until the non-conformances are resolved.

The requested enforcement discretion due date extension would provide WCNOC sufficient time to address the non-conforming conditions and achieve compliance. WCNOC has concluded that there is no undue risk associated with the requested extension.

WCNOC respectfully requests NRC approval of this enforcement discretion date extension prior to June 10, 2018 (i.e., the current expiration date).

This letter contains no commitments. If you have any questions concerning this matter, please contact me at (620) 364-4204 or Bill Muilenburg at (620) 364-4186.

Sincerely,



Cynthia R. Hafenstine

CRH/rlt

Attachment: Justification for Request to Extend the Expiration Date for Enforcement Discretion Regarding Tornado Missile Protection Requirements for Wolf Creek Generating Station

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

## **JUSTIFICATION FOR REQUEST TO EXTEND THE EXPIRATION DATE FOR ENFORCEMENT DISCRETION REGARDING TORNADO MISSILE PROTECTION REQUIREMENTS FOR WOLF CREEK GENERATING STATION**

### **1. Introduction**

This attachment provides the justification for the Wolf Creek Nuclear Operating Corporation (WCNOC) request to extend the expiration date for enforcement discretion regarding tornado missile protection requirements for Wolf Creek Generating Station (WCGS).

In Reference 1, the Nuclear Regulatory Commission (NRC) issued Regulatory Issue Summary (RIS) 2015-06, "Tornado Missile Protection," to, in part, remind licensees of the need to conform to their plants' current, site-specific licensing bases for tornado-generated missile protection.

In Reference 2, the NRC provided in Enforcement Guidance Memorandum (EGM) 15-002 guidance to exercise enforcement discretion when a licensee does not comply with the plant's current site-specific licensing basis for tornado-generated missile protection. EGM 15-002 identified WCGS as a higher tornado missile risk site (Group A), resulting in an enforcement discretion expiration date of June 10, 2018.

WCNOC completed a comprehensive tornado missile protection assessment for WCGS and has identified non-conforming conditions regarding tornado missile protection requirements. Compensatory measures were implemented to address the non-conforming conditions, in accordance with regulatory guidance. One of these non-conformances was addressed permanently through a modification. There remains one non-conformance with tornado-generated missile protection at WCGS.

WCNOC is requesting an extension to the enforcement discretion expiration date to allow sufficient time to address the remaining nonconforming condition.

WCNOC plans to evaluate the remaining non-conforming condition, perform a modification to eliminate the non-conformance, or a combination of the two.

This request to extend enforcement discretion was prepared in accordance with guidance in Appendix B of Revision 1 of Interim Staff Guidance DSS-ISG-2016-01 (Reference 3).

### **2. RIS 2015-06 Assessment Methodology**

The methodology followed by WCNOC for the WCGS assessment in response to RIS 2015-06 includes the following three objectives:

- document the WCNOC current licensing basis (CLB) for tornados and tornado missile protection,
- evaluate the site's conformance with the tornado missile protection CLB through a design review and plant walkdowns, and document any non-conforming conditions, and
- resolve the non-conforming conditions within the WCNOC corrective action program.

### **3. Summary of CLB for Tornado and Tornado Missile Protection Design**

The WCGS CLB for tornados and tornado missile protection pertinent to the RIS 2015-06 assessment is described in Revision 31 of the WCGS Updated Safety Analysis Report (USAR) Sections 3.1, 3.3, and 3.5.

#### **CLB for External Events/Hazards**

USAR Section 3.1 provides a discussion regarding how WCGS conforms with the General Design Criteria (GDCs). In this section, there is a description of design assumptions related to external events/hazards (e.g., tornadoes, floods, pipe breaks, etc.).

- a. Should the event result in a turbine or reactor trip, loss of offsite power is assumed, and the plant will be placed in a hot standby condition.
- b. If required by a limiting condition for operation (per Technical Specifications or if the recovery from the event will cause the plant to be shutdown for an extended period time, the plant will be taken to a cold shutdown (CSD) condition.
- c. Redundancy or diversity of systems and components is provided to enable continued operation at hot standby or to cool the reactor to a CSD condition. If required, it is assumed that temporary repairs can be made to circumvent damages resulting from the hazard. All available systems, including non-safety-related systems and those systems requiring operating action may be employed to mitigate the consequences of the hazard.

In determining the availability of the systems required to mitigate the consequences of a hazard and those required to place the reactor in a safe condition, the direct consequences of the hazard are considered. The feasibility of carrying out operator actions are based on ample time and adequate access to the controls, motor control center, switchgear, etc., associated with the component required to accomplish the proposed action.

- d. When the postulated hazard occurs and results in damage to one of two or more redundant or diverse trains, single failures of components in other trains (and associated supporting trains) are not assumed. The postulated hazard is precluded, by design, from affecting the opposite train or from resulting in a DBA. For the situation in which a hazard affects a safety-related component, the event and subsequent activities are governed by Technical Specification requirements in effect when that component is not functional.

#### **CLB for Tornado Protection Design**

As discussed in USAR Section 3.3.2.1, the design basis tornado has a tangential velocity of 290 miles per hour (mph) at a radius of 150 feet combined with a translational velocity of 70 mph. A minimum translational speed of 5 mph was used to maximize the transit time of the tornado across exposed plant features. An atmospheric pressure drop of 3.0 pounds per square inch (psi) at a linear rate of 2.0 psi per second was also used.

As described in USAR Section 3.3.2.2, all seismic Category I structures are designed to prevent venting, with the exception of the main steam tunnel and the fuel building which are

vented to the atmosphere with the exterior walls and roofs designed to resist the full pressure differential (3.0 psi) due to the design basis tornado. The interior walls and slabs are designed to resist the differential pressures between compartments that occur as a result of venting the structure.

#### CLB for Tornado Missile Protection Design

USAR Section 3.5 states that adequate missile protection is provided to ensure that those portions of the essential structures, systems, or components whose failure would result in the failure of the integrity of the reactor coolant system, reduce the functioning to an unacceptable level of any plant feature required for safe shutdown, or lead to offsite radiological consequences are designed and constructed so as not to fail or cause such a failure in the event of a postulated credible missile impact.

The tornado-resistant structures include the following:

- Reactor building
- Control building
- Fuel building
- Auxiliary building
- Diesel Generator building
- Diesel fuel oil storage tank access vaults
- Turbine building (for structural framing integrity only)
- Communications Corridor (for structural framing integrity only)
- Essential Service Water System (ESWS) Pumphouse
- ESWS electrical manholes and access vaults
- Station Blackout Diesel Generator Missile Barrier (for structure only, unoccupied by personnel)
- ESWS Vertical Loop Chase

Per USAR Table 3.5-1, Seismic Category I structures were designed for the following CLB tornado missiles:

Missile	Weight, lbs	Horizontal Velocity, fps
4" thick x 12" wide x 12' long wooden plank	115	272
6" diameter, schedule 40 steel pipe, 15' long	286	170
1" diameter steel rod, 3' long	9	167
13.5" diameter utility pole, 35' long	1123	180
12" diameter, schedule 40 steel pipe, 15' long	749	154
16.4' x 6.6' x 4.3' automobile	3991	194

Neither the automobile nor the utility pole need be considered for any portion of the structures which is 30 feet above the highest ground elevation.

Vertical velocities of 70 percent of the indicated horizontal velocities are considered for all missiles, except the 1" diameter steel rod which is critical for penetration and is assumed to have a vertical velocity equal to the horizontal velocity.

#### **4. RIS 2015-06 Assessment Scope and Results:**

The assessment completed reviews and walkdowns of WCGS systems, structures, and components which were designed to withstand the tornado missiles specified in the CLB.

The non-conforming conditions, and affected systems, identified by WCNOG during the design reviews and walkdowns were documented in the following 2 condition reports within the corrective action program:

##### **a. CR 112131: Emergency Diesel Generator (EDG) System**

During the evaluation of tornado missile protection of safety-related (SR) equipment, WCGS personnel identified an unanalyzed condition related to the truck connections to the fuel oil transfer lines. The truck connections are non-safety related (NSR) pipes that penetrate the wall of the Diesel Generator building to the outside environment, and are not protected from tornado missiles. These truck connections are connected to the SR fuel oil transfer lines which provide the pathway for fuel oil to be pumped from the underground storage tank, to the day tank inside the Diesel Generator building. 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. At the time of discovery, there was 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.

##### **b. CR 115590: Main Steam System**

The NSR exhaust stacks from the steam generator main steam safety valves (MSSVs) and the atmospheric relief valves (ARVs) were determined to be susceptible to tornado generated missile impacts. If any of the exhaust lines are completely crimped, it could prevent the associated valve from performing its safety function.

#### **5. Initial Actions**

The following initial actions were taken in response to the identified non-conforming conditions, in accordance with EGM 15-002 and DSS-ISG-2016-01:

- a. The initial non-conforming condition was reported by WCNOG as an eight-hour notification on April 5, 2017 (Event Number 52666) under the following regulations:
  - 10 CFR 50.72(b)(3)(ii)(B) "The nuclear power plant being in an unanalyzed condition that significantly degrades plant safety."
  - 10 CFR 50.72(b)(3)(v)(A) "Shut down the reactor and maintain it in a safe shutdown condition;"
  - 10 CFR 50.72(b)(3)(v)(D) "Mitigate the consequences of an accident;"

The NRC Senior Resident Inspector was also notified. Consistent with the guidance provided in EGM 15-002, the subsequent discovery of the non-conformance involving the MSSVs and ARVs was not required to be reported under 10 CFR 50.72.

- b. Operability determinations were completed and documented in the corrective action program. The non-conforming equipment was initially declared inoperable. Guidance in Revision 1 of EGM 15-002 was used to declare the equipment operable but non-conforming and to implement enforcement discretion.
- c. Initial compensatory measures were completed per EGM 15-002 and DSS-ISG-2016-01 as described below:
  - 1) The following procedures for performing actions to respond to a tornado were verified to be in-place and that training is current:
    - AI 14-006, Severe Weather,
    - OFN SG-003, Natural Events,
    - Station procedures for the use of FLEX equipment to attain and maintain cold shutdown conditions.
  - 2) If a Tornado Watch is in effect in Coffey County, the following will occur:
    - Shift Manager shall make a site wide announcement that there is a Tornado Watch in effect.
    - Shift Manager shall ensure walkdowns are performed to verify that any items that could become a projectile or potential hazard are secure.
    - Shift Manager will review plant risk for ongoing and upcoming maintenance.
    - Weather radar will be monitored in the Control Room and at Security.
    - Security, when directed, shall ensure all vital doors as identified in Security procedures are closed.
    - Vehicle Maintenance should place a vehicle in the alternate FLEX building capable of moving jersey barriers and pipe pods during normal working hours if conditions worsen.
  - 3) If a Tornado Warning is in effect in Coffey County, the following activities shall occur:
    - Shift Manager shall notify onsite personnel that a tornado warning is in effect.
    - If the tornado is expected to directly impact the plant, then personnel are directed to suspend outside activities until further notice.
  - 4) In the case of a Tornado Warning for WCGS:
    - Shift Manager shall make an appropriate announcement.
    - Security, when directed, shall sound the tornado siren.
    - Personnel will immediately move to a designated storm shelter for the facility they are in at the time of the warning, or see the best available shelter if the designated shelter cannot be reached prior to the storm's arrival.
    - Stop all transfer of radioactive materials.
    - Stop using all cranes.
- d. Licensee Event Reports (LERs) 2017-002-00 (Reference 5) and 2017-003-00 (Reference 6) were submitted in accordance with 10 CFR 50.73 due to Technical Specification-required equipment that did not meet CLB requirements for protection against tornado missiles.

**6. Long-Term Compensatory Measures and Actions Implemented and/or Planned**

The guidance in DSS-ISG-2016-01, Rev. 1, Appendix A, was followed in the establishment of longer-term, more comprehensive measures. In the cases of non-conformances resulting in the use of Enforcement Discretion, the long-term compensatory measures were implemented as soon as practical and less than 60 days after initial discovery. The long-term compensatory measures included maintaining the initial compensatory measures, and they met the threshold of providing for prompt recovery of SSC function from tornado missile effects. Additionally, the comprehensive measures represent a discernable change from the pre-discovery actions. The measures taken will remain in place until restoration of conformance with licensing-basis protection requirements.

The initial non-conformance discovered, which was the EDG fuel oil truck connection, was permanently removed by plant modification prior to 60 days following its discovery. As such, no specific long-term compensatory measures were needed for this identified condition.

Portions of the ARV and MSSV exhaust stacks extend beyond tornado resistant building structures where they are subject to impact from design basis tornado-generated missiles. These exhaust stacks represent the only remaining non-conformance with respect to tornado missile protection. Due to the robust nature of the exhaust piping, the limited applicability of the most damaging design basis missiles based on the height of the building structure, and the number of individual targets that would have to be severely damaged, it is very unlikely that a tornado-missile strike on the potentially vulnerable piping or silencers would prevent the ARV or MSSV safety functions from being met. Two of the four ARVs are adequate to meet shutdown requirements (USAR Table 10.3-3).

The comprehensive compensatory measures taken include prioritizing the visual assessment of these exhaust stacks following a severe weather event, procedural guidance directing operators to the location of a cut-off saw such that damaged portions of the ARV or MSSV exhaust stacks can be cut and removed following severe weather if necessary.

**7. Assessment of Long-Term Compensatory Measures Coincident with Other Operator Actions**

The comprehensive compensatory measures established to address the remaining non-conforming condition and other expected operator actions in response to severe weather and a subsequent loss of offsite power (LOOP) were collectively assessed. This assessment considered the timing and duration of the operator actions specified within the compensatory measures coincident with the other actions the operators may need to perform in response to a severe weather LOOP event.

The prioritization of walkdowns of the MSSV and ARV exhaust stacks following a severe weather event has minimal effect on other operator actions that may be needed. The prioritized walkdown allows prompt damage assessment that will inform remedial actions that may mitigate the event and result in prompt initiation of recovery efforts. The remedial action taken, if necessary, to cut off portions of damaged exhaust stacks does not require an excessive amount of time or effort as a 14" cut-off saw (and fuel and required PPE) has been pre-staged inside the primary FLEX building.



## **8. Plans for Permanent Resolution**

WCNOC has implemented a modification to remove the tornado missile vulnerability presented by the EDG fuel oil truck connection. The pipes have been cut and capped inside in the building, the penetrations grouted, and tornado resistant plates have been installed on the outside of the wall covering the previously existing penetration.

WCNOC is currently pursuing the option to submit a risk-informed license amendment request for the use of the Tornado Missile Risk Evaluator (TMRE) methodology, currently in development by the industry, or other acceptable alternate methodology. The risk-informed methodology would be used to evaluate the identified non-conformances. In the event that an acceptable risk-informed methodology is not available for use or does not yield suitable results to evaluate the identified non-conforming condition, the option of performing a modification to eliminate the non-conformance or detailed structural analysis would be pursued as necessary.

## **9. Basis and Reason for Extension Request**

In EGM 15-002, the NRC provided guidance to exercise enforcement discretion when an operating power reactor licensee does not comply with the plant's current site specific licensing basis for tornado-generated missile protection. The NRC would exercise this enforcement discretion only when a licensee implements initial compensatory measures to provide additional protection, followed by more comprehensive, long-term compensatory measures implemented within 60 days of issue discovery. The enforcement discretion would expire three years after issuance of RIS 2015-06, dated June 10, 2015, for plants of a higher tornado risk (Group A Plants), and five years after RIS issuance for plants of a lower tornado risk (Group B Plants). EGM 15-002 identified WCGS as a plant of a higher tornado missile risk; therefore, its enforcement discretion would expire on June 10, 2018.

The NRC issued Revision 1 of EGM 15-002, which stated that licensees may request an extension to their enforcement guidance expiration date if proper justification is provided. This extension would be granted on a case-by-case basis.

In accordance with the revised EGM 15-002, WCNOC is requesting an extension of the expiration date for enforcement discretion at WCGS from June 10, 2018, to June 10, 2020.

There is no undue risk associated with this requested extension of the enforcement discretion due date. The remaining non-conformance involves limited exposure of equipment to tornado missiles as well as being particularly robust. In addition, tornado missile scenarios generally do not represent a significant safety concern because their risk is bounded by the initiating event frequency. A comprehensive assessment of the site regarding tornado missile protection against the current licensing basis has been completed, revealing the non-conformance discussed above. The compensatory actions implemented for the non-conformance is consistent with the guidance in EGM 15-002 and Interim Staff Guidance DSS-ISG-2016-01, and provide assurance that the consequences of the remaining non-conformance are minimized until permanently resolved. Additionally, a collective review was performed to confirm that the site operators can perform the long-term compensatory measures coincident with other actions they may need to perform in a severe weather LOOP event without putting unnecessary burden on the operators. These compensatory measures would remain in-place throughout the period of extended enforcement discretion, until the remaining non-conformance is resolved.

The requested enforcement discretion expiration date of June 10, 2020 would allow WCNOG sufficient time to resolve the tornado missile protection non-conformance and restore the site to compliance.

## **10. References**

1. NRC Regulatory Issue Summary 2015-06, Tornado Missile Protection, dated June 10, 2015 (ADAMS Accession Number ML15020A419)
2. NRC Memorandum, Enforcement Guidance Memorandum 15-002, Enforcement Discretion for Tornado Generated Missile Protection Non-Compliance, dated June 10, 2015 (ADAMS Accession Number ML15111A269)
3. NRC Interim Staff Guidance, DSS-ISG-2016-01, "Clarification of Licensee Actions in Receipt of Enforcement Discretion per Enforcement Guidance Memorandum EGM 15-002, Enforcement Discretion for Tornado-Generated Missile Protection Noncompliance," Revision 1, dated November 2017 (ADAMS Accession Number ML 17128A344)
4. NRC Memorandum, Enforcement Guidance Memorandum 15-002, Revision 1, Enforcement Discretion for Tornado-Generated Missile Protection Noncompliance, dated February 7, 2017 (ADAMS Accession Number ML 16355A286)
5. Licensee Event Report 2017-002-00, Inadequate Protection from Tornado Missiles Identified Due to Nonconforming Design Conditions, dated May 24, 2017 (ADAMS Accession Number ML 17144A289)
6. Licensee Event Report 2017-003-00, ARV and MSSV Tornado Missile Vulnerabilities Result in Unanalyzed Condition, dated November 2, 2017 (ADAMS Accession Number ML17317A462)