From: Lee, Samson
Sent: Wednesday, February 23, 2022 4:15 PM
To: Joshua Turner
Subject: Request for additional information - Wolf Creek request to revise diesel generator completion time (EPID: L-2021-LLA-0173)

BACKGROUND

By application dated September 29, 2021 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML21272A369), Wolf Creek Nuclear Operating Corporation (the licensee) requested changes to the Technical Specifications (TSs) for Renewed Facility Operating License Number NPF-42 for the Wolf Creek Generating Station (Wolf Creek). The proposed changes would revise TS 3.8.1, “AC [alternating current] Sources – Operating,” by removing the requirements associated with the Sharpe Station gensets and extending the Completion Time (CT) in Required Action B.4.1 for one inoperable diesel generator (DG) from 72 hours to 14 days based upon the availability of a supplemental AC power source (i.e., Station Blackout (SBO) DG System).

The licensee also proposed to revise the Renewed Facility Operating License No. NPF-42, Appendix D, “Additional Conditions,” by deleting the license conditions associated with Amendment No. 163.

In Attachment IX to the Wolf Creek license amendment request (LAR), the licensee discusses how it implemented NRC guidance Branch Technical Position (BTP) 8-8, "Onsite (Emergency Diesel Generators) and Offsite Power Sources Allowed Outage Time Extensions," dated February 2012 (ADAMS Accession No. ML113640138), in the LAR.

The NRC staff has reviewed the LAR and determined that additional information is required to complete the review. The NRC staff’s requests for additional information (RAIs) are listed below. The staff may have additional RAIs. The NRC staff held a draft RAI clarification call with the licensee staff on February 23, 2022. The licensee staff requested, and NRC agreed, to an RAI response by April 11, 2022.

The NRC staff considers that timely responses to RAIs help ensure sufficient time is available for staff review and contribute toward the NRC’s goal of efficient and effective use of staff resources. Please note that if you do not respond to this request by the agreed upon date or provide an acceptable alternate date, we may deny your application for amendment under the provisions of Title 10 of the *Code of Federal Regulations* (10 CFR), Section 2.108. If circumstances result in the need to revise the agreed upon response date, please contact me at (301) 415-3168 or via e-mail Samson.Lee@nrc.gov.

REGULATORY REQUIREMENTS AND GUIDANCE

The NRC staff used the following regulatory requirements to review the LAR:

10 CFR, Part 50.36, “Technical Specifications,” requires, in part, that the operating license of a nuclear production facility include TSs. 10 CFR 50.36 (c)(2) requires that the TSs include limiting conditions for operation (LCOs), which are the lowest functional capability or performance levels of equipment required for safe operation of the facility. When an LCO of a nuclear reactor is not met, the licensee shall shut down the reactor or follow any remedial action permitted by the technical specifications until the condition can be met.

10 CFR, Appendix A of Part 50, General Design Criterion (GDC) 17, “Electric Power Systems,” requires, in part, that an onsite electric power system and an offsite electric power system be provided to permit functioning of structures, systems, and components important to safety. The safety function for each system (assuming the other system is not functioning) shall be to provide sufficient capacity and capability to assure that (1) specified acceptable fuel design limits and design conditions of the reactor coolant pressure boundary are not exceeded as a result of anticipated operational occurrences and (2) the core is cooled and containment integrity and other vital functions are maintained in the event of postulated accidents. The onsite electric power supplies shall have sufficient independence, redundancy, and testability to perform their safety functions assuming a single failure.

Wolf Creek TS 1.3, “Completion Times,” establishes the CT convention and provides guidance for its use. Usage rules for LCOs are in TS Section 3.0, “3.0 Limiting Condition for Operation (LCO) Applicability.” Per LCO 3.0.2, “Upon discovery of a failure to meet an LCO, the Required Actions of the associated Conditions shall be met…” While the Wolf Creek TS Sections 1.0 and 3.0 are not regulations, they constitute license requirements imposed on plant operation.

The NRC staff also considered the following guidance document to evaluate the LAR:

BTP 8-8, which was developed to provide guidance to the NRC staff for reviewing LARs for Allowed Outage Time (AOT) or CT extensions for the onsite and offsite power sources to perform online maintenance of the power sources.

ELECTRICAL ENGINEERING

RAI EEEB-1

Section 2.3.1 of Attachment I to the LAR describes the proposed TS changes to Conditions A, B, C, and H of TS 3.8.1.

As stated in Section 2.3.1.2 of Attachment I to the LAR, the licensee proposed to add a new Required Action B.2 to verify the availability of the required SBO DGs:

CONDITION	REQUIRED ACTION	COMPLETION TIME

B. One DG inoperable.	AND B.2 Verify the required Station Blackout (SBO) DGs are available.	1 hour AND Once per 8 hours thereafter

As stated in Section 2.3.1.3 of Attachment I to the LAR, the licensee proposed to revise Condition C to reflect the unavailability of the required SBO DG(s) when a DG is inoperable:

CONDITION	REQUIRED ACTION	COMPLETION TIME
C. Required Action B.2 and associated Completion Time not met.	C.1 Restore DG to OPERABLE status or restore required SBO DGs to available status.	72 hours from discovery of unavailability of required SBO DGs OR 24 hours from discovery of Condition B entry ≥ 48 hours concurrent with unavailability of required SBO DGs

As stated in Section 2.3.1.3 of Attachment I to the LAR, the licensee proposed to revise Condition H to reflect the changes to Condition B. Attachment IV to the LAR shows the licensee's proposed revision to Condition H:

H. Required Action and associated Completion Time of Condition A, C, D, E, F, or G not met. OR Required Actions B.1, B.3, B.4.1, B.4.2, and B.5 and associated Completion Time not met.	H.1 Be in MODE 3. AND H.2 Be in MODE 5.	6 hours 36 hours

Section 2.3.1.2 of Attachment I to the LAR states:

> Unavailability of the required SBO DGs does not, by itself, result in the LCO not being met.

However, BTP 8-8 states, in part, that the plant should start shutting down the unit within 24 hours if the supplemental source becomes unavailable any time during the extended AOT.

The licensee used “OR” to connect the two CTs for Condition C, meaning these CTs apply alternatively. The first alternate CT states “72 hours from discovery of unavailability of required SBO DGs.” The NRC staff understands that if the SBO DGs becomes unavailable during the extended CT, the DG could remain inoperable for an additional 72 hours instead of 24 hours from discovery of unavailability of SBO DGs before the plant would enter Condition H to start shutting down when the DG cannot be restored to operable status. This does not appear consistent with the recommendations of BTP 8-8.

The licensee proposed an alternate Required Action C.1 to “restore required SBO DGs to available status” within the alternate CTs of Condition C. The NRC staff understands that the plant would continue operating (1) with an inoperable DG and unavailable SBO DGs for more than 24 hours up to 72 hours after discovery of SBO DGs unavailability during the extended CT instead of shutting down after 24 hours, as recommended by BTP 8-8, and (2) with an inoperable DG for a period of up to 14 days including a 72-hour period of SBO DGs unavailability after restoring the SBO DGs to available status. This also does not appear consistent with the recommendations of BTP 8-8.

Please address the following:

(a) Provide justifications for (1) the proposed first CT (72 hours from discovery of unavailability of required SBO DGs) of Condition C and (2) the proposed alternate Required Action C.1 to “restore required SBO DGs to available status,” each of which would allow the plant continued operation with an inoperable DG for more than 24 hours up to 72 hours after discovery of SBO DGs unavailability during the extended CT. Alternatively, provide TS CT that would allow 24 hours of continued operation from discovery of SBO DGs unavailability, consistent with BTP 8-8.

(b) The proposed CT for Required Action C.1 does not appear to require appropriate remedial measures within an appropriate time when the LCO is not met. In addition, the proposed CT appears too long compared to the CT recommended by BTP 8-8. Please provide a discussion of other remedial measures, taken in CTs shorter than 24 hours, that may be appropriate.

RAI EEEB-2

Section 3.4.1 of Attachment I to the LAR states:

> The SBO DG System includes three non-safety related Kohler 3250 kW DGs and one Power Equipment Center (PEC).

Section 3.4.2 of Attachment I to the LAR states:

> Three DGs sufficiently power all LOOP [loss of offsite power] loads. An engineering evaluation was performed utilizing the Electrical Transient Analysis Program (ETAP) to perform load flow, short circuit, and motor starting analyses for LOOP scenarios. Calculation XX-E-022 and the engineering evaluation determined that two SBO DGs can successfully start the minimum required safe shutdown loads with sufficient starting voltages provided the loads are manually started with at least 30 seconds provided between starts.

BTP 8-8 recommends that the supplemental power source capable of supplying the LOOP loads to bring the unit to a cold shutdown be provided as a backup to a single inoperable EDG in case of a LOOP event concurrent with a failure of the remaining DG during the extended AOT.

Provide a summary of the evaluation performed to determine that two SBO DGs can successfully start the minimum required safe shutdown loads with sufficient starting voltages to bring the unit to cold shutdown during an SBO, consistent with the recommendation of BTP 8-8.

TECHNICAL SPECIFICATIONS

RAI STSB-1

The licensee’s discussion regarding changes to Condition C does not contain information regarding the proposed TS non-logical connector “or” separating the component names in C.1. Please discuss whether a TS logical connector “OR” and associated formatting are appropriate for proposed changes to Required Action C.1.

MECHANICAL ENGINEERING

RAI EMIB-1

Provide how the SBO diesel fuel oil tanks are replenished.

RAI EMIB-2

Provide the historical surveillance testing results for the SBO DGs.

CONSIDERATION OF RISK INSIGHTS

The licensee states that the proposed amendment represents a deterministic based amendment supplemented by risk insight information. Therefore, the NRC staff does not review the licensee's probabilistic risk assessment models to determine their technical acceptability. The NRC staff does not rely on the quantitative risk information provided by the licensee in the LAR. However, the NRC staff considers the licensee-provided qualitative risk insights and associated compensatory measures in its decision on the proposed change.

RAI APLC-1: Seismic Risk Insights

Section 3.4.1, "SBO DG System Description," of Attachment I to the LAR describes the SBO DG system. This section states that the SBO DG system consists of a missile barrier located outside of the protected area that contains the equipment required to provide power during a station blackout event. This section also states that the missile barrier is constructed to provide protection from tornado winds and tornado generated missiles. During its review, the NRC staff noted that the LAR does not discuss the impact of a seismic event on the SBO DGs or missile barrier housing the SBO DGs.

Section 4.1, "External Hazards," of Attachment II to the LAR provides a qualitative discussion of the impact of a seismic event when a DG is out of service for the extended CT. This section describes the impact of a seismic event on the DGs and states that the DG building is seismically rugged.

Section 4.1 of Attachment II to the LAR states that the primary impact expected from a seismic event is a LOOP. This section also states that the seismically induced failures of the DGs are correlated, so one DG being out of service does not impact the seismic response. This section concludes that the change in risk associated with a DG being out of service for the extended CT is therefore equivalent to the change in risk from the internal events model for random failures.

Section 4.1 of Attachment II to the LAR does not discuss the impact of a seismic event on the SBO DGs. Based on the discussion in Section 3.4.1, of Attachment I to the LAR, the NRC staff notes that the SBO DGs may fail at lower seismic demands than the DGs. Specifically, a seismic event could result in a LOOP and a seismically induced correlated failure of all three SBO DGs without a corresponding loss of the DGs. In the context of the proposed change, this can result in a scenario involving a seismically induced LOOP combined with a seismically induced correlated failure of all SBO DGs and a random failure of the available DG with the other DG being out of service. In this scenario, it is unclear to the NRC staff that the change in seismic risk associated with a DG being out of service for the extended CT would be equivalent to the change in risk from the internal events model for random failures, as asserted in Section 4.1 of Attachment II to the LAR.

Please address the following:

(a) Discuss seismic risk insights associated with the SBO DGs, including consideration of the NRC staff identified scenario, to support the LAR.

(b) Discuss consideration of risk mitigation actions to address seismic risk insights associated with the SBO DGs.

RAI APLC-2: Fire Risk Insights

Section 3.7, "Risk Management/Work Control and Scheduling," of Attachment I to the LAR describes how the risk impact of maintenance, testing, and equipment outages is assessed. This section states that an On-Line Nuclear Safety and Generation Risk Assessment is completed for the current weekly schedule and that maintenance and testing activities added to the weekly schedule are assessed for their impact upon the existing On-Line Nuclear Safety and Generation Risk Assessment. This section also states that online daily maintenance and testing activities are planned, scheduled, and conducted in a manner to ensure both commercial and nuclear safety issues are assessed and the associated risks are managed. This section further states that risk assessment and management is accomplished, in part, by developing compensatory measures to manage and minimize the operational risks associated with planned or emergent activities that are categorized as risk significant.

Section 4.1, "External Hazards," of Attachment II to the LAR provides a qualitative discussion of the impact of fire events when a DG is out of service for the extended CT. This section discusses that the fire risk associated with a DG being out of service for the extended CT will increase for areas where a fire can damage the capability to receive offsite power to the safeguards buses. This section states that the only area where an internal fire can cause a LOOP is the communications corridor. During its review, the NRC staff noted that the LAR does not discuss if the SBO DGs or their associated cables, including those supplying the safeguard buses, could be affected by a fire in the communications corridor. Further, it is unclear to the staff if the On-Line Nuclear Safety and Generation Risk Assessment considers the risk of a fire in the communications corridor causing a LOOP.

Please address the following:

(a) Clarify if the On-Line Nuclear Safety and Generation Risk Assessment considers the risk of a fire in the communications corridor causing a LOOP.

(b) Discuss fire risk insights associated with the communications corridor and the SBO DGs or their associated cables, including those supplying the safeguard buses, to support the LAR.

(c) Discuss consideration of risk mitigation actions to address fire risk insights associated with the communications corridor.

RAI APLC-3: Common Cause and Human Reliability Risk Insights

Section 3.4.2, “SBO DG – AC System Analysis,” of Attachment I to the LAR describes an analysis of the SBO DGs. This section states that three SBO DGs can successfully power all LOOP loads and two SBO DGs can successfully power the minimum required safe shutdown loads provided the loads are manually started at least 30 seconds between starts. This section also states that plant operating procedures contain guidance for manually starting the safe shutdown loads. The NRC staff understands these statements to mean that a single SBO DG cannot successfully power the minimum required safe shutdown loads.

Section 5.11, “Risk Insights,” of Attachment II to the LAR discusses the licensee’s risk insights supporting this LAR. Based on its review of these risk insights, it is unclear to the NRC staff if the common-cause failure of SBO DGs and the human reliability to start the SBO DGs and power the safe shutdown loads were considered in the risk insights used to support the LAR.

Please address the following:

(a) Discuss how the common-cause failure of SBO DGs and the human reliability to start the SBO DGs and power the safe shutdown loads were included in the risk insights used to support the LAR.

(b) Discuss consideration of risk mitigation actions to address risk insights associated with the common-cause failure of SBO DGs and the human reliability to start the SBO DGs and power the safe shutdown loads.

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