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February 9, 2021

U.S. Nuclear Regulatory Commission
11555 Rockville Pike
Rockville, MD 20852-2738

Attention: Document Control Desk

Subject: Request for U.S. Nuclear Regulatory Commission (NRC) Clarification on NAC-UMS Limiting Condition for Operation (LCO) 3.1.6, CONCRETE CASK Heat Removal System, Required Action B.1

References:
1. NAC-UMS Certificate of Compliance (CoC), Amendment 7, July 29, 2019
2. NAC-UMS Final Safety Analysis Report (FSAR), Revision 14, July 2019

NAC, hereby, requests NRC clarification on the meaning of "engineering evaluation" as written in Reference 1, LCO 3.1.6, Required Action B.1. Specifically, are there any limitations on what method of evaluation (MOE) an NAC-UMS cask user can use when performing the required engineering evaluation that verifies the CONCRETE CASK heat removal system is operable?

In the context of this LCO, NAC does not believe there are any limitations on what MOE can be used when performing the "engineering evaluation". This interpretation, in part, is because an "engineering evaluation" is not a defined term in the technical specifications, the LCO bases do not elaborate on what constitutes an "engineering evaluation", and the LCO required action has a 5 day time limit for completion.

In addition, NAC does not believe there is a nexus between the MOE performed for an "engineering evaluation" in this LCO and the restrictions on MOEs as specified in 10 CFR 72.48. Specifically, the change regulation 10 CFR 72.48 restricts the ability to use alternate MOEs other than what is explicitly stated in the licensing basis when the two regulatory exceptions are not met. Since compliance with this LCO required action is outside the requirements of 10 CFR 72.48, NAC does not believe the regulatory restrictions on MOEs as specified in 10 CFR 72.48 are applicable.

For convenience, the LCO in question is provided via Enclosure 1 to this letter. In addition, the technical specification bases from Reference 2 for LCO 3.1.6 is provided via Enclosure 2. Should there be any questions regarding this request, please contact me via email at wfowler@nacintl.com or via phone at 678-328-1236.

Sincerely,

Wren Fowler Digitally signed by Wren Fowler Date: 2021.02.09 09:33:33 -05'00'

Wren Fowler
Director, Licensing
Engineering

Enclosures
Enclosure 1 – NAC-UMS CoC Amd. 7, LCO 3.1.6, CONCRETE CASK Heat Removal System
Enclosure 2 – NAC-UMS FSAR Rev. 14, Chapter 12, Appendix C, Section C 3.1.6, CONCRETE CASK Heat Removal System

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Enclosure 1

NAC-UMS CoC Amd. 7, LCO 3.1.6
CONCRETE CASK Heat Removal System

A 3.1 NAC-UMS® SYSTEM

A 3.1.6 CONCRETE CASK Heat Removal System

LCO 3.1.6 The CONCRETE CASK Heat Removal System shall be OPERABLE.

APPLICABILITY: During STORAGE OPERATIONS

ACTIONS

----------NOTE----------

Separate Condition entry is allowed for each NAC-UMS® SYSTEM.

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. CONCRETE CASK heat removal system inoperable	A.1 Ensure adequate heat removal to prevent exceeding short-term temperature limits	Immediately
	AND	
	A.2 Restore CONCRETE CASK Heat Removal System to OPERABLE status	25 days
B. Required Actions A.1 or A.2 and associated Completion Times not met	B.1 Perform an engineering evaluation to determine that the CONCRETE CASK Heat Removal System is OPERABLE	5 days
	OR	
	B.2 Place the NAC-UMS SYSTEM in a safe condition	5 days

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SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.1.6.1	Verify the difference between the ISFSI ambient temperature and the average outlet air temperature of at least two outlet vents (at least two vents must be located 180° apart from each other) is ≤102°F for the PWR canister or ≤ 92°F for the BWR canister	24 hours
	OR	
	Visually verify all four air inlet and outlet screens are unobstructed	24 hours
SR 3.1.6.2	Verify the difference between the ISFSI ambient temperature and the average outlet air temperature of at least two outlet vents (at least two vents must be located 180° apart from each other) is ≤ 102°F for the PWR canister or ≤ 92°F for the BWR canister	Once between 5 and 30 days after STORAGE OPERATIONS begin

Enclosure 2

NAC-UMS FSAR Rev. 14
Chapter 12, Appendix C, Section C 3.1.6
CONCRETE CASK Heat Removal System

C 3.1 NAC-UMS® SYSTEM Integrity

C 3.1.6 CONCRETE CASK Heat Removal System

BASES

BACKGROUND	The CONCRETE CASK Heat Removal System is a passive, air-cooled convective heat transfer system, which ensures that heat from the CANISTER is transferred to the environment by the upward flow of air through the CONCRETE CASK. Relatively cool air is drawn into the annulus between the CONCRETE CASK and the CANISTER through the four air inlets at the bottom of the CONCRETE CASK. The CANISTER transfers its heat from the CANISTER surface to the air via natural convection. The buoyancy created by the heating of the air creates a chimney effect and the air flows back into the environment through the four air outlets at the top of the CONCRETE CASK.
APPLICABLE SAFETY ANALYSIS	The thermal analyses of the CONCRETE CASK take credit for the decay heat from the spent fuel assemblies being ultimately transferred to the ambient environment surrounding the CONCRETE CASK. Transfer of heat away from the fuel assemblies ensures that the fuel cladding and CANISTER component temperatures do not exceed applicable limits. Under normal storage conditions, the four air inlets and four air outlets are unobstructed and full air flow (i.e., maximum heat transfer for the given ambient temperature) occurs. Analyses have been performed for the complete obstruction of all of the air inlets and outlets. The complete blockage of all air inlets and outlets stops air cooling of the CANISTER. The CANISTER will continue to radiate heat to the relatively cooler inner shell of the CONCRETE CASK. With the loss of air cooling, the CANISTER component temperatures will increase toward their respective short-term temperature limits. The limiting components are the CANISTER basket support and heat transfer disks, which, by analysis, approach their temperature limits in 24 hours, if no action is taken to restore air flow to the heat removal system. The maximum fuel clad temperatures remain below allowable accident limits for approximately six days (150 hours) with complete air flow blockage.
LCO	The CONCRETE CASK Heat Removal System must be verified to be OPERABLE to preserve the assumptions of the thermal analyses.

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LCO (continued)	Operability of the heat removal system ensures that the decay heat generated by the stored fuel assemblies is transferred to the environment at a sufficient rate to maintain fuel cladding and CANISTER component temperatures within design limits.
APPLICABILITY	The LCO is applicable during STORAGE OPERATIONS. Once a CONCRETE CASK containing a CANISTER loaded with spent fuel has been placed in storage, the heat removal system must be OPERABLE to ensure adequate heat transfer of the decay heat away from the fuel assemblies.
ACTIONS	A note has been added to ACTIONS that states for this LCO, separate Condition entry is allowed for each CONCRETE CASK. This is acceptable since the Required Actions for each Condition provide appropriate compensatory measures for each CONCRETE CASK not meeting the LCO. Subsequent CONCRETE CASKs that do not meet the LCO are governed by subsequent Condition entry and application of associated Required Actions. <u>A.1</u> If the CONCRETE CASK heat removal system has been determined to not be OPERABLE, it must be restored to an analyzed safe status immediately, with adequate heat removal capability. Immediately, defined as the required action to be pursued without delay and in a controlled manner, provides a reasonable period of time (i.e., within the design basis time limit as presented in Section 11.2.13 or within the time limit for a less than design basis heat load case, as evaluated) to take action to remove the obstructions in the air flow path. In order to meet A.1, adequate heat removal capability must be verified to exist, either by visual observation of at least two unobstructed air inlet and outlet screens or by physically clearing any blockage from two air inlet and outlet screens, to prevent exceeding the short-term temperature limits. Thermal analysis of a fully blocked CONCRETE CASK shows that without adequate heat removal, the fuel cladding accident temperature limit could be exceeded over time. As a result, requiring immediate verification of adequate heat removal capability will ensure that the CONCRETE CASK and CANISTER components and the fuel cladding do not exceed their short-term temperature limits. The thermal analysis also shows that complete blockage of two air inlet and outlet screens results in no potential for exceeding accident fuel cladding, CONCRETE CASK or CANISTER component temperature limits. As a result, verifying that there are at least two unobstructed

(continued)

ACTIONS (continued)

air inlet and outlet screens will ensure that the accident temperature limits are not exceeded during the time that the remainder of the air inlet and outlet screens are returned to OPERABLE status.

AND

A.2

In addition to Required Action A.1 that ensures the adequate heat removal capability and verify the fuel loading, restoring the CONCRETE CASK Heat Removal System to OPERABLE is not an immediate concern. Therefore, restoring it within 25 days is considered a reasonable period of time.

B.1

If the Required Actions A.1 or A.2 cannot be met, an engineering evaluation is performed to verify that the CONCRETE CASK heat removal system is OPERABLE.

The Completion Time for this Required Action of 5 days will ensure that the CANISTER remains in a safe, analyzed condition.

OR

B.2

Place the affected NAC-UMS SYSTEM in a safe condition.

The Completion Time for this Required Action is 5 days. Requiring B.2 action completion within 5 days will ensure that the NAC-UMS SYSTEM is maintained in a safe condition.

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SURVEILLANCE REQUIREMENTS	SR 3.1.6.1 The long-term integrity of the stored fuel is dependent on the ability of the CONCRETE CASK to reject heat from the CANISTER to the environment. Visual observation that all four air inlet and outlet screens are unobstructed and intact ensures that air flow past the CANISTER is occurring and heat transfer is taking place. However, partial blockage of less than two air inlet or outlet screens or the equivalent effective screen area does not result in the heat removal system being unable to provide adequate heat removal. Corrective actions should be taken promptly to remove the obstruction and restore full flow through the affected air inlet and outlet screens. Alternatively, based on the analyses, if the air temperature rise is less than the limits stated in the SR, adequate air flow and, therefore, adequate heat transfer is occurring to provide assurance of long-term fuel cladding integrity. The reference ambient temperature used to perform this Surveillance shall be measured at the ISFSI facility. A minimum of two outlet air temperatures must be measured to provide an average outlet temperature to comply with Technical Specification SURVEILLANCE REQUIREMENT 3.1.6.1. The Frequency of 24 hours is reasonable based on the time necessary for CONCRETE CASK and CANISTER components to heat up to unacceptable temperatures assuming design basis heat loads, and allowing for corrective actions to take place upon discovery of the blockage of the air inlet and outlet screens. SR 3.1.6.2 The initial confirmation of the OPERABILITY of the CONCRETE CASK is established based on air temperature measurements at the CONCRETE CASK outlets and the ISFSI ambient, and verification that the air temperature rise is less than the limits stated in the SR. Following the initial confirmation, the continued OPERABILITY of the CONCRETE CASK shall be confirmed by one of the verification methods specified in SR 3.1.6.1. The specified Frequency of once between 5 and 30 days after beginning STORAGE OPERATIONS is reasonable and ensures that the CONCRETE CASK has reached thermal equilibrium and, therefore, the outlet air temperature measurements will reflect expected temperatures under normal operations. Completion of the measurements within 30 days of placement of the CONCRETE CASK into STORAGE OPERATIONS ensures that corrective actions can be taken to establish the OPERABLE status of the CONCRETE CASK within a reasonable period of time.
REFERENCES	1. FSAR Chapter 4 and Chapter 11, Section 11.1.2 and Section 11.2.13.