SAFETY EVALUATION REPORT
Docket No. 72-1025
NAC-MPC STORAGE SYSTEM
Certificate of Compliance No. 1025
Amendment No. 5

SUMMARY

By application dated July 17, 2006, and supplement dated September 13, 2006, NAC International (NAC) submitted a request to the U.S. Nuclear Regulatory Commission to amend the Certificate of Compliance (CoC) No. 1025 for the NAC Multi-Purpose Canister System (MPC), to revise technical specifications (TS) to incorporate changes to the reporting and monitoring requirements, and incorporate guidance from NRC Interim Staff Guidance, ISG-22, "Potential Rod Splitting Due to Exposure to an Oxidizing Atmosphere During Short-Term Cask Loading Operations in LWR or Other Uranium Oxide Based Fuel." NAC also requested in its supplement to the amendment request that the CoC be updated to remove the requirement for installation of tamper-indicating devices on the Vertical Concrete Casks and to make this requirement optional. Lastly, NAC requested several editorial changes to improve the clarity of the documents associated with the MPC system.

The NRC staff has reviewed the application, and based on the statements and representations in the application, as supplemented, concludes that the NAC-MPC system, as amended, meets the requirements of Part 72 of Title 10 of the Code of Federal Regulations (10 CFR Part 72). The changes to the CoC and the TS are indicated by change bars in the margins.

BACKGROUND

The NAC-MPC system consists of the following components: transportable storage canister that contains the spent fuel; a vertical concrete cask that contains the transportable storage canister; and a transfer cask that contains the transportable storage cask during loading, unloading and transfer operations. Each transportable storage canister stores up to 36 fuel assemblies from the Yankee Nuclear Power Plant (Yankee Rowe) or up to 26 fuel assemblies from the Connecticut Yankee Atomic Power Company (Haddam Neck). Both are decommissioned pressurized water reactors.

MATERIALS EVALUATION

A materials review was performed on the application to verify that guidance from ISG-22 was appropriately incorporated into the Final Safety Analysis Report (FSAR). The NAC-MPC is licensed to store and transport low burnup intact and damaged PWR fuel clad in either Zircaloy or stainless steel, and that was irradiated in the Yankee Rowe and Haddam Neck reactors. The changes to the materials evaluation were all related to the loading procedure. In accordance with the recommendation from ISG-22, all references to backfilling with air have been removed and the loading requirement now specifies that the canister be backfilled with inert gas.

Three chapters in the FSAR were revised to incorporate recommendations from ISG-22. Chapter 3.0, Structural Evaluation was revised to remove a reference to air. Chapter 7.0, Confinement, was revised to remove two references to air. Chapter 8.0, Operating Procedures, was revised to change references from air to gas and added notes that the fuel rods should not be exposed to air.

The staff finds that there are no safety issues related to this change and any retrievability problems related to the potential oxidation of the damaged fuel by an air atmosphere have been eliminated. Therefore, the changes are acceptable.

THERMAL EVALUATION

The application proposed several modifications to the TS and the FSAR to include the option to visually verify that all four air inlet and outlet screens are unobstructed and operable in lieu of daily temperature monitoring.

In addition to the TS changes that are proposed, the revised monitoring requirements will change several chapters in the FSAR. A thermal evaluation was completed for the proposed changes. The staff evaluated the following modifications to the FSAR associated with revised thermal monitoring requirements.

> Chapter 1.0, General Description, was revised to reflect the addition of the option to visually verify air inlet and outlet screens are unobstructed ensuring operability of the cask's heat removal system. The requirements for temperature-monitoring via instrumentation-only were removed. In addition, the chapter was revised to address daily surveillance of the heat removal capability of the concrete cask.
>
> Chapter 2.0, Principle Design Criteria, was revised throughout to reflect the alternative for daily visual inspection of the air inlet and outlet screens for blockage. Also, a visual inspection of the air inlet and outlet vents requirement was added following any natural phenomena event.
>
> Chapter 9.0, Acceptance Test and Maintenance Program, Thermal Test Section, was revised to reflect the proposed changes to TS. The Maintenance Program was revised to reference the revised TS for visual monitoring and added the requirement for verification of the operability of the cask by visual monitoring of the inlet and outlet vents for blockage on a 24-hour frequency.
>
> Chapter 10.0, Radiation Protection, of the FSAR was revised to add an option for temperature measurement or daily visual monitoring of cask inlet and outlet vents for the purpose of verifying that they are unobstructed.
>
> Chapter 11.0, Accident Analysis, was revised throughout to include changes associated with the revised thermal monitoring requirement allowing visual inspections of air inlet and outlet vents. The changes refer to the basis of the analysis for verifying the safety of the cask for blockages of 24-hours or less. Section 11.1.3.2 was added and refers to the analysis in Section 11.2.8 of the FSAR. Other changes to this section include recovery and corrective action changes to correspond to the changes in the TS and the visual monitoring of the air vents.
>
> Chapter 12.0, Operating Control and Limits, was revised to reflect the changes in the thermal monitoring requirements. Changes were made to the CONCRETE CASK Heat Removal System, ACTIONS and SURVEILLANCE REQUIREMENTS. The changes in these sections correspond to the 24-hour visual inspection interval for the blockages of cask vents.

The staff reviewed the changes as stated above for revisions to the thermal monitoring and to the proposed visual verification and found that this does provide the capability to determine when corrective action needs to be taken to maintain safe storage conditions in accordance with the requirements of 10 CFR 72.122(h)(4). The staff finds that a 24-hour interval between visual measurements provides reasonable assurance that the thermal conditions of the cask will not become unsafe should the air inlet and outlet vents become blocked.

REVISION TO THE CERTIFICATE OF COMPLIANCE FOR TAMPER-INDICATING DEVICES

In a supplement dated September 13, 2006, NAC requested that the CoC be revised to remove the requirement for tamper-indicating devices from the Description section. NAC requested that the requirement for installation of a tamper-indicating device on the Vertical Concrete Casks be revised to be optional. There is no requirement in 10 CFR Part 72 for tamper-indicating devices for the bolts on cask lids. Accordingly, the staff finds that tamper-indicating devices are not required and updating the Description section in the CoC to remove this requirement is acceptable.

CHANGE TO CERTIFICATE OF COMPLIANCE AND TECHNICAL SPECIFICATIONS

The change to the Certificate of Compliance No. 72-1025 is the removal of the tamper-indicating device requirement from the Description section. Appendix A, Technical Specifications for the NAC-MPC System, has been revised in several places for clarification, but mainly to allow for visual verification that all four air inlet and outlet screens are unobstructed. The FSAR was also revised throughout to support the TS changes.

<u>Changes to Appendix A, Technical Specifications for the NAC-MPC System</u>

- Definitions (pp. A1-3, A1-4) - Revised definition of “OPERABLE.”
- Definitions (p. A1-4) - Deleted “SAFE CONDITION” and its definition.
- Definitions (p. A1-5) - Deleted “(STORAGE CASK)” from the VERTICAL CONCRETE CASK (CONCRETE CASK) term.
- TS A.3.1 (p. A3-13) - Added “Integrity” to the title of the section.
- TS A.3.1 (p. A3-13) ACTIONS, CONDITION A - Changed “CONCRETE CASK Heat Removal System inoperable” to “LCO not met.”
- TS A.3.1 (p. A3-13) ACTIONS, CONDITION B - After “AND” in REQUIRED ACTION, changed to read as follows:
  - “B.2.1 Perform an engineering evaluation to determine that the CONCRETE CASK Heat Removal System is OPERABLE”
    “OR”
  - “B.2.2 Place the NAC-MPC SYSTEM in a safe condition.”
- TS A.3.1 (p. A3-14) - SURVEILLANCE SR 3.1.6.1 - added
  - “OR”
  - “Visually verify all four air inlet and outlet screens are unobstructed.”
- TS A.3.1 (p. A3-14) - Deleted SR 3.1.6.2.

- TS A 5.3 (p. A5-2) - Revised as follows:

  "A Response Surveillance is required following off-normal, accident or natural phenomena events. The NAC-MPC SYSTEMs in use at an ISFSI shall be inspected within 4 hours after the occurrence of an off-normal, accident or natural phenomena event in the area of the ISFSI. This inspection must specifically verify that all the CONCRETE CASK inlets and outlets are not blocked or obstructed. At least one-half of the inlets and outlets on each CONCRETE CASK must be cleared of blockage or debris within 24 hours to restore air circulation.

  The CONCRETE CASK and CANISTER shall be inspected if they experience a drop or a tip-over.

  Following a natural phenomena event, the ISFSI shall be inspected to determine if movement or damage to the CONCRETE CASKS has resulted in unacceptable site boundary dose rates."

Changes to Appendix B, Technical Specifications for the NAC-MPC System

- Table of Contents (p. B-2) - Added, "B 3.2 Design Features Significant to Safety."
- TS B 2.2.3 - Changed the requirement for reporting from 30 to 60 days.
- TS B 3.2 (p. B3-1) - Revised title to "Design Features Significant to Safety"
- TS B 3.2.1 (p. B3-1) - Revised title to "Criticality Control"
- TS B 3.2.2 (p. B3-1) - Added new Item B 3.2.2 titled, "Fuel Cladding Integrity."

CONCLUSION

The staff has reviewed the proposed changes to the CoC, TS and FSAR for the NAC-MPC system. Based on the statements and representations contained in the application as supplemented, the staff concludes that these changes do not adversely affect the ability of the NAC-MPC storage system to meet the requirements of 10 CFR Part 72.

Issued with Certificate of Compliance No. 1025, Amendment No. 5 on July 24, 2007.