CERTIFICATE OF COMPLIANCE FOR SPENT FUEL STORAGE CASKS

The U.S. Nuclear Regulatory Commission is issuing this Certificate of Compliance pursuant to Title 10 of the *Code of Federal Regulations*, Part 72, "Licensing Requirements for Independent Storage of Spent Nuclear Fuel and High-Level Radioactive Waste" (10 CFR Part 72). This certificate is issued in accordance with 10 CFR 72.238, certifying that the storage design and contents described below meet the applicable safety standards set forth in 10 CFR Part 72, Subpart L, and on the basis of the Final Safety Analysis Report (FSAR) of the cask design. This certificate is conditional upon fulfilling the requirements of 10 CFR Part 72, as applicable, and the conditions specified below.

Certificate No.	Effective Date	Expiration Date	Docket No.	Amendment No.	Amendment Effective Date	Package Identification No.
1031	2/4/2009	2/4/2029	72-1031	12	10/16/2023	USA/72-1031
	Renewed Effective Date	Renewed Expiration Date		Revision No.	Revision Effective Date	
	N/A	N/A		2	TBD	

Issued To: (Name/Address)

NAC International Inc.
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Safety Analysis Report Title

NAC International Inc., Final Safety Analysis Report for the MAGNASTOR® System, Docket No. 72-1031

APPROVED SPENT FUEL STORAGE CASK

Model No.: MAGNASTOR®

Description

The MAGNASTOR® system is certified as described in the safety analysis report (SAR) and in NRC's safety evaluation report (SER) accompanying the certificate of compliance (CoC).

The MAGNASTOR® system (the cask) consists of the following components: (1) transportable storage canister (TSC), which contains the spent fuel; (2) storage overpack, which contains the TSC during storage; and (3) a transfer cask, which contains the TSC during loading, transfer and unloading operations. The cask may store up to 37 pressurized water reactor (PWR) fuel assemblies or 89 boiling water reactor (BWR) fuel assemblies. Authorized PWR and BWR contents are specified in Appendix B to this Certificate.

The TSC is the confinement system for the stored fuel. The TSC assembly consists of a right circular cylindrical shell with a welded bottom plate, a fuel basket, a closure lid, a closure ring, and two sets of redundant penetration port covers. The cylindrical shell plus the bottom plate, closure lid, and welded inner port covers are stainless steel and constitute the confinement boundary. The electroless nickel-coated carbon steel fuel basket is a developed-cell circular cylinder configuration with either 37 PWR or 81 or 89 BWR fuel assembly locations. The fuel assembly locations (cells) in the PWR and BWR baskets include neutron absorber panels on up to four sides for criticality control. Each neutron absorber panel is covered by a stainless steel sheet to protect the material during fuel loading and unloading, and to maintain it in position.

There are two types of storage overpacks, a concrete storage cask or a metal storage overpack. The storage overpack containing the TSC provides structural support, shielding, protection from environmental conditions, and natural convection cooling of the TSC during long-term storage. The concrete cask body is a reinforced concrete structure with a carbon steel inner liner. The liner inner diameter incorporates standoffs to minimize impact loads on the TSC and to maintain convective heat flow paths under accident conditions.

Description (Continued)

The concrete storage cask has an annular air passage to allow a passive convection air flow around the TSC. The air inlets and outlets are offset in elevation from the TSC to minimize radiation streaming. The spent fuel decay heat is transferred from the fuel assemblies to the TSC shell using pressurized helium circulated by convection through the fuel basket, conduction and radiation. Heat flows by convection from the TSC shell to the circulating air and by radiation from the TSC shell to the concrete cask liner. The heated air is exhausted, by convective flow, through the concrete cask air outlets. The top of the concrete cask is closed by a carbon steel lid with concrete shielding and is bolted in place.

The metal storage overpack is a cylindrical, structural shield wall formed with carbon steel inner and outer liners that encase the NS-3 neutron shielding material. The metal storage overpack has a carbon steel inner base. The NS-3 shield wall and steel liners provide the neutron and gamma radiation shielding for the stored spent fuel. The inner and outer liners provide the structural strength to protect the TSC and its contents. The metal storage overpack provides an annular air passage to allow natural circulation of air around the TSC to remove the decay heat from the contents. The lower air inlet and upper air outlet vents are carbon steel penetrations in the bottom weldment and inner liner, respectively. Each air inlet/outlet vent is covered with a screen. The weldment baffle directs the air upward and around the pedestal that supports the TSC.

There are three different designs for the transfer cask, the standard MAGNASTOR® transfer cask (MTC), the passive MAGNASTOR® transfer cask (PMTC) and the light-weight MAGNASTOR® transfer cask (LMTC). The MTC provides shielding during TSC movements between workstations, the overpack, or the transport cask. It is a multiwall (carbon steel/lead/NS-4-FR/steel) design with retractable (hydraulically operated) bottom shield doors that are used during loading and unloading operations. There is a second version of the transfer cask, the MTC2. The only difference from the MTC is that the MTC2 has stainless steel walls.

Primary difference between the PMTC and the standard MTC is that the PMTC contains a demineralized water shield tank instead of NS-4-FR. The PMTC is designed for use in a high ambient temperature environment to passively cool the loaded TSC during transfer operations.

The LMTC intended for use at facilities with limited crane capacity and for TSCs with high-heat loads. The LMTC includes a demineralized water-filled neutron shield tank which can be drained for pool loading operations to reduce the hook wet weight, then refilled to restore neutron shielding prior to performing canister draining, drying, and closure operations. Similar to the PMTC, the LMTC structural components are all fabricated from stainless steel.

CONDITIONS

1. OPERATING PROCEDURES

   Written operating procedures shall be prepared for cask handling, loading, movement, surveillance, and maintenance. The user's site-specific written operating procedures shall be consistent with the technical basis described in Chapter 9 of the SAR.

2. ACCEPTANCE TESTS AND MAINTENANCE PROGRAM

Written cask acceptance tests and a maintenance program shall be prepared consistent with the technical basis described in Chapter 10 of the SAR. Metal matrix composites (MMCs), as described in Chapter 10 of the SAR, are limited to 0.5% open porosity, as determined by qualification testing. This restriction does not apply to neutron absorbing plates constructed from Boral.

3. QUALITY ASSURANCE

Activities in the areas of design, purchase, fabrication, assembly, inspection, testing, operation, maintenance, repair, modification of structures, systems and components, and decommissioning that are important to safety shall be conducted in accordance with a Commission-approved quality assurance program which satisfies the applicable requirements of 10 CFR Part 72, Subpart G, and which is established, maintained, and executed with regard to the cask system.

4. HEAVY LOADS REQUIREMENTS

Each lift of a MAGNASTOR® TSC, transfer cask, or overpack must be made in accordance with the heavy loads requirements and procedures of the licensed facility at which the lift is made. A plant-specific safety review (under 10 CFR 50.59 or 10 CFR 72.48 requirements, if applicable) is required to show operational compliance with existing plant-specific heavy loads requirements.

5. APPROVED CONTENTS

Contents of the MAGNASTOR® system must meet the specifications given in Appendix B to this certificate.

6. DESIGN FEATURES

Features or characteristics for the site, cask, or ancillary equipment must be in accordance with Appendix A to this certificate.

7. CHANGES TO THE CERTIFICATE OF COMPLIANCE

The holder of this certificate who desires to make changes to the certificate, which includes Appendix A (Technical Specifications and Design Features) and Appendix B (Approved Contents), shall submit an application for amendment of the certificate.

8. AUTHORIZATION

The MAGNASTOR® system, which is authorized by this certificate, is hereby approved for general use by holders of 10 CFR Part 50 and Part 52 licenses for nuclear reactors at reactor sites under the general license issued pursuant to 10 CFR 72.210, subject to the conditions specified by 10 CFR 72.212, and the attached Appendix A and Appendix B.

9. CONTINUED USE OF PREVIOUS VERSION OF AMENDMENT NO. 12

A general licensee may continue to use the previous version of this certificate, Amendment No. 12, Revision 1, dated March 19, 2025, until **{insert date 6 months after effective date}**. By **{insert date 6 months after effective date}**, general licensees using Amendment No. 12, Revision 1, must have implemented the changes authorized by this revision and completed the evaluation described below.

The general licensee shall perform written evaluations before use and before applying the changes authorized by this revised certificate which establish that the cask, once loaded with spent fuel or once the changes authorized by this revised certificate have been applied, will conform to the terms, conditions, and specifications of this revised certificate. The results of this review shall be documented in accordance with 10 CFR 72.212(b)(5) no later than **{insert date 6 months after effective date}**.

FOR THE NUCLEAR REGULATORY COMMISSION

DRAFT

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Attachments:
1. Appendix A
2. Appendix B

Dated: _____