INTERIM STORAGE PARTNERS

January 14, 2021
E-58104

Director, Division of Fuel Management
Office of Nuclear Material Safety and Safeguards
U. S. Nuclear Regulatory Commission
Attn: Document Control Desk
One White Flint North
11555 Rockville Pike
Rockville, MD 20852

Subject: Supplemental information to Support NRC's Continued Review of the Safety Case for the WCS CISF, Docket 72-1050 CAC/EPID 001028/L-2017-NEW-0002

Interim Storage Partners LLC (ISP) provides the following supplemental information regarding the NAC transfer casks related to protection against tornado missiles during transfer operations in the Cask Handling Building (CHB) between the transportation cask and the Vertical Concrete Casks (VCCs). This submittal also includes minor editorial changes to the SAR to: update the revision level of QP-10.02 from Revision 1 to Revision 2 which was reviewed by the NRC as part of previous responses to RAIs; ensure internally-consistent-references to the "Standardized Advanced NUHOMS® System"; provide clarification that the evaluations for the VCC storage pads are bounding for the CTS pad; and a regulatory citation in Proposed License Condition 16.

The following enclosures are being submitted with the above described clarifications:

- Enclosure 1 includes an affidavit pursuant to 10 CFR 2.390 for NAC International
- Enclosure 2 provides changes to the Proposed License and associated Technical Specifications addressing the issues identified above.
- Enclosure 3 provides the SAR change pages (Proprietary Version)
- Enclosure 4 provides the public version of the SAR change pages

Should you have any questions regarding this submission, please contact Mr. Jack Boshoven of my staff by telephone at (410) 910-6955, or by email at jack.boshoven@orano.group.

Sincerely,

Jeffery D. Isakson
Chief Executive Officer/President
Interim Storage Partners LLC

cc: John-Chau Nguyen, Senior Project Manager, U.S. NRC
Jack Boshoven, ISP LLC
Elicia Sanchez, ISP LLC

Enclosures:

1. Affidavit Pursuant to 10 CFR 2.390 for NAC International
2. Updated Proposed License and associated Technical Specification (Public)
3. SAR Change Pages (Proprietary)
4. SAR Change Pages (Public)

Enclosure 1 to 58104

Affidavit Pursuant to 10 CFR 2.390 for NAC International

NAC INTERNATIONAL

NAC INTERNATIONAL
AFFIDAVIT PURSUANT TO 10 CFR 2.390

George Carver (Affiant), Vice President, Engineering and Support Services, hereinafter referred to as NAC, at 3930 East Jones Bridge Road, Peachtree Corners, Georgia 30092, being duly sworn, deposes and says that:

1. Affiant has reviewed the information described in Item 2 and is personally familiar with the trade secrets and privileged information contained herein and is authorized to request its withholding.

2. The information to be withheld includes the following NAC Proprietary Information that is being provided in support of the NRC review of SAR Revision 5 for Interim Storage Partners (ISP) Centralized Interim Storage Facility (CISF) site-specific license application (NRC Docket No. 72-1050).

    - Submittal E-58104, WCS Consolidated Interim Storage Facility Safety Analysis Report, Page 7-15

    NAC is the owner of this information that is considered to be NAC Proprietary Information.

3. NAC makes this application for withholding of proprietary information based upon the exemption from disclosure set forth in: the Freedom of Information Act ("FOIA"); 5 USC Sec. 552(b)(4) and the Trade Secrets Act; 18 USC Sec. 1905; and NRC Regulations 10 CFR Part 9.17(a)(4), 2.390(a)(4), and 2.390(b)(1) for "trade secrets and commercial financial information obtained from a person, and privileged or confidential" (Exemption 4). The information for which exemption from disclosure is herein sought is all "confidential commercial information," and some portions may also qualify under the narrower definition of "trade secret," within the meanings assigned to those terms for purposes of FOIA Exemption 4.

4. Examples of categories of information that fit into the definition of proprietary information are:

    a. Information that discloses a process, method, or apparatus, including supporting data and analyses, where prevention of its use by competitors of NAC, without license from NAC, constitutes a competitive economic advantage over other companies.

    b. Information that, if used by a competitor, would reduce their expenditure of resources or improve their competitive position in the design, manufacture, shipment, installation, assurance of quality or licensing of a similar product.

    c. Information that reveals cost or price information, production capacities, budget levels or commercial strategies of NAC, its customers, or its suppliers.

    d. Information that reveals aspects of past, present or future NAC customer-funded development plans and programs of potential commercial value to NAC.

e. Information that discloses patentable subject matter for which it may be desirable to obtain patent protection.

The information that is sought to be withheld is considered to be proprietary for the reasons set forth in Items 4.a, 4.b, and 4.d.

5. The information to be withheld is being transmitted to the NRC in confidence.

6. The information sought to be withheld, including that compiled from many sources, is of a sort customarily held in confidence by NAC, and is, in fact, so held. This information has, to the best of my knowledge and belief, consistently been held in confidence by NAC. No public disclosure has been made, and it is not available in public sources. All disclosures to third parties, including any required transmittals to the NRC, have been made, or must be made, pursuant to regulatory provisions or proprietary agreements, which provide for maintenance of the information in confidence. Its initial designation as proprietary information and the subsequent steps taken to prevent its unauthorized disclosure are as set forth in Items 7 and 8 following.

7. Initial approval of proprietary treatment of a document/information is made by the Vice President, Engineering, the Project Manager, the Licensing Specialist, or the Director, Licensing – the persons most likely to know the value and sensitivity of the information in relation to industry knowledge. Access to proprietary documents within NAC is limited via "controlled distribution" to individuals on a "need to know" basis. The procedure for external release of NAC proprietary documents typically requires the approval of the Project Manager based on a review of the documents for technical content, competitive effect and accuracy of the proprietary designation. Disclosures of proprietary documents outside of NAC are limited to regulatory agencies, customers and potential customers and their agents, suppliers, licensees and contractors with a legitimate need for the information, and then only in accordance with appropriate regulatory provisions or proprietary agreements.

8. NAC has invested a significant amount of time and money in the research, development, engineering and analytical costs to develop the information that is sought to be withheld as proprietary. This information is considered to be proprietary because it contains detailed descriptions of analytical approaches, methodologies, technical data and/or evaluation results not available elsewhere. The precise value of the expertise required to develop the proprietary information is difficult to quantify, but it is clearly substantial.

Public disclosure of the information to be withheld is likely to cause substantial harm to the competitive position of NAC, as the owner of the information, and reduce or eliminate the availability of profit-making opportunities. The proprietary information is part of NAC's comprehensive spent fuel storage and transport technology base, and its commercial value extends beyond the original development cost to include the development of the expertise to determine and apply the appropriate evaluation process. The value of this proprietary information and the competitive advantage that it provides to NAC would be lost if the information were disclosed to the public. Making such information available to other parties, including competitors, without their having to make similar investments of time, labor and money would provide competitors with an unfair advantage and deprive NAC of the opportunity to seek an adequate return on its large investment.

NAC INTERNATIONAL

NAC INTERNATIONAL
AFFIDAVIT PURSUANT TO 10 CFR 2.390 (continued)

STATE OF GEORGIA, COUNTY OF GWINNETT

Mr. George Carver, being duly sworn, deposes and says:

That he has read the foregoing affidavit and the matters stated herein are true and correct to the best of his knowledge, information and belief.

Executed at Peachtree Corners, Georgia, this 13 day of January, 2021.

George Carver
Vice President, Engineering and Support Services
NAC International

Subscribed and sworn before me this 13 day of January, 2021.

Heath Michael Baldner
Notary Public

HEATH MICHAEL BALDNER
My Commission Expires
NOTARY PUBLIC
07-20-2024
FORSYTH COUNTY, GEORGIA

Enclosure 2 to 58104

Updated Proposed License and associated Technical Specification
(Public)

LICENSE FOR INDEPENDENT STORAGE OF SPENT NUCLEAR FUEL AND HIGH-LEVEL RADIOACTIVE WASTE

Pursuant to the Atomic Energy Act of 1954, as amended, the Energy Reorganization Act of 1974 (Public Law 93-438), and Title 10, Code of Federal Regulations, Chapter 1, Part 72, and in reliance on statements and representations heretofore made by the licensee, a license is hereby issued authorizing the licensee to receive, acquire, and possess the power reactor spent fuel and other radioactive materials associated with spent fuel storage designated below; to use such material for the purpose(s) and at the place(s) designated below; and to deliver or transfer such material to persons authorized to receive it in accordance with the regulations of the applicable Part(s). This license shall be deemed to contain the conditions specified in Section 183 of the Atomic Energy Act of 1954, as amended, and is subject to all applicable rules, regulations, and orders of the Nuclear Regulatory Commission now or hereafter in effect and to any conditions specified herein.

This license is conditioned upon fulfilling the requirements of 10 CFR Part 72, as applicable, the attached Appendix A (Technical Specifications), and the conditions specified below

Licensee

1. Interim Storage Partners LLC (ISP)

2. WCS CISF
9998 Highway 176 West
Andrews, Texas, 79714

3. License No. SNM-1050
Amendment No. 0

4. Expiration Date December XX, 20XX

5. Docket or Reference No. 72-1050

6. Byproduct, Source, and/or Special Nuclear Material	7. Chemical and/or Physical Form	8. Maximum Amount That Licensee May Possess at Any One Time Under This License
A. Spent nuclear fuel elements from commercial nuclear utilities licensed pursuant to 10 CFR Part 50 , including those stored under either a Part 50 general license or Part 72 specific license, and associated fuel assembly control components and associated radioactive materials related to the receipt, transfer, and storage of that spent nuclear fuel.	A. Intact fuel assemblies, damaged fuel assemblies, failed fuel and fuel debris, as allowed by Materials License SNM-2510, Amendment 4; Table 1-1c or Table 1-1j of Certificate of Compliance No. 1004, Amendments 3 through 13; Table 1-1t of Certificate of Compliance No. 1004, Amendments 10 through 13; Section 2.1 of Certificate of Compliance No. 1029, Amendments 0, 1, and 3; Section B 2.1 of Certificate of Compliance No. 1025, Amendments 0 through 6; Section B 2.1.2 of Certificate of Compliance No. 1015, Amendments 0 through 5; Table B 2-1 of Certificate of Compliance No. 1031, Amendments 0 through 3 Revision 1, and 4 through 5, modified as described in Condition 9 below.	A. 5,000 MT of Uranium or Mixed-Oxide (MOX) in the form of intact spent fuel assemblies, damaged fuel assemblies, failed fuel assemblies, and fuel debris. In addition, the cumulative amount of material received and accepted during the licensed term of the facility may not exceed 5,000 Metric Tons of Uranium plus MOX.
B. Greater than Class C Waste, reactor related material generated as a result of plant operations and decommissioning where radionuclide concentration limits of Class C waste in 10 CFR 61.55 are exceeded.	B. Greater than Class C Waste, as activated and potentially surface contaminated metals comprised of miscellaneous solid waste resulting from segmentation and decommissioning processes.	B. 231.3 MT (510,000 pounds) of Greater than Class C Waste.

9. Authorized Use: The material identified in 6.A, 6.B, 7.A and 7.B above is authorized for receipt, possession, storage, and transfer at the WCS Consolidated Interim Storage Facility (WCS CISF), as described in the WCS CISF Final Safety Analysis Report (FSAR) as updated. Storage of fuel is authorized only in canisters referenced in Section 2.1 of the Attachment, Appendix A Technical Specifications and all fuel with assembly average burnup greater than 45 GWd/MTHM shall be canned inside the canister.

10. Authorized Place of Use: The licensed material is to be received, possessed, transferred, and stored at the WCS CISF, geographically located within Andrews County, Texas.

11. The Technical Specifications contained in the Appendix attached hereto are incorporated into the license. The Licensee shall operate the installation in accordance with the Technical Specifications in the Appendix.

12. *Reserved*.

13. Reserved.

14. *Reserved*.

15. *Reserved*.

16. The Licensee shall:

    (1) follow the Physical Protection Plan entitled, “WCS Consolidated Interim Storage Facility (CISF) Physical Security Plan,” Revision 5, dated September 18, 2019, as it may be further amended under the provisions of 10 CFR 72.44(e) and 72.*186(b)*;

    (2) follow the Safeguards Contingency Plan entitled, "WCS Consolidated Interim Storage Facility (CISF) Training and Qualification Plan Appendix B to the CISF Physical Security Plan," Revision 5, dated September 18, 2019, as it may be further amended under the provisions of 10 CFR 72.44(e) and 72.*186(b)*;

    (3) follow the Guard Training and Qualification Plan entitled "WCS Consolidated Interim Storage Facility (CISF) Safeguards Contingency Plan Appendix C to the CISF Physical Security Plan," Revision 5, dated September 18, 2019, as it may be further amended under the provisions of 10 CFR 72.44(e) and 72.*186(b)*;

    (4) follow the Additional Security Measures for the Physical Protection of Dry Independent Spent Fuel Storage Installations; and

    (5) follow the Additional Security Measures for Access Authorization and Fingerprinting at Independent Spent Fuel Storage Installations.

17. Construction of the WCS CISF shall not commence before funding (equity, revenue, and debt) is fully committed, that is adequate to construct a facility with the initial capacity as specified by the Licensee to the NRC. Construction of any additional capacity beyond the initial capacity amount shall commence only after funding is fully committed that is adequate to construct such additional capacity.

18. The Licensee shall:

    (1) include in the contracts provisions requiring clients to retain title to the material identified in 6.A, 6.B, 7.A or 7.B, and allocating legal and financial liability among the Licensee and the client(s);

    (2) include in the contracts provisions requiring clients to periodically provide credit information, and, when necessary, additional financial assurances such as guarantees, prepayment, or payment bond(s);

    (3) include in the contracts a provision requiring the Licensee not to terminate the license prior to furnishing storage services covered by the contract.

19. The Licensee shall obtain onsite and offsite insurance coverage in the amounts committed to by ISP in the ISP license application.

20. The Licensee shall submit License Amendment(s) to this license containing 10 CFR 72.42 compliant AMPs and TLAAs based on License Renewals of the following CoCs listed below, within 120 days of the effective date of CoC Approval for each of the following:

    <u>AMP for NAC Systems</u>

    The Licensee shall commit to the AMPs committed to in the approved CoC Renewal of CoC 1015 AND 1025 AND 1031 for all applicable NAC Spent Fuel Canisters and storage overpacks. In the event that the current CoC holder for CoC 1015 and/or 1025 and/or 1031 does not submit a timely renewal as defined in 10 CFR Part 72.240, ISP shall submit a license amendment with AMP and TLAA information within one (1) year following the timely renewal deadline defined in 10 CFR 72.240 (b), for the applicable CoC.

21. The Licensee shall submit a Startup Plan to the NRC at least 90 days prior to receipt and storage of the material identified in 6.A, 6.B, 7.A or 7.B at the facility.

22. Reserved.

23. Prior to commencement of operations, the Licensee shall have an executed contract with the U.S. Department of Energy (DOE) or other SNF Title Holder(s) stipulating that the DOE or the other SNF Title Holder(s) is/are responsible for funding operations required for storing the material identified in 6.A, 6.B, 7.A or 7.B at the CISF as licensed by the U.S. Nuclear Regulatory Commission.

24. Prior to receipt of the material identified in 6.A, 6.B, 7.A or 7.B, the Licensee shall have a financial assurance instrument required pursuant to 10 CFR 72.30 acceptable to the U.S. Nuclear Regulatory Commission.

25. This license is effective as of the date of issuance shown below.

FOR THE NUCLEAR REGULATORY COMMISSION

John McKirgan, Chief
Spent Fuel Licensing Branch
Division of Spent Fuel Management
Office of Nuclear Material
Safety and Safeguards

Date of Issuance December XX, 20XX

Attachments: Appendix A –WCS Interim Storage Facility Technical Specifications

PROPOSED

MATERIALS LICENSE No. SNM-1050

APPENDIX A

WCS CONSOLIDATED INTERIM STORAGE FACILITY TECHNICAL SPECIFICATIONS

Docket 72-1050

Amendment 0

TABLE OF CONTENTS PAGE

1.0 USE AND APPLICATION

1.1 Definitions

-- NOTE --

The defined terms of this section appear in capitalized type and are applicable throughout these Technical Specifications and Bases.

Term	Definition
ACTIONS	ACTIONS shall be that part of a Specification that prescribes Required Actions to be taken under designated Conditions within specified Completion Times.
CANISTER	CANISTERs are the sealed used nuclear fuel containers that consist of a fuel basket contained in a cylindrical shell, which is a welded pressure vessel that provides confinement of used fuel assemblies in an inert atmosphere or a cylindrical shell containing GTCC waste.
CANISTER TRANSFER SYSTEM (CTS)	The CTS is a structure designed for the transfer of a CANISTER from or to the TRANSPORTATION CASK to or from a VCC.
CASK HANDLING BUILDING (CHB) CRANES	The CASK HANDLING BUILDING (CHB) CRANES are minimum 130 ton overhead cranes used with special lifting devices as a single-failure-proof handling system to upright and transfer vertical TRANSPORTATION CASKS between the railcar and a laydown area permitting cask movement using the VCT. The CHB CRANES also support STC transfer and receipt inspection and shipment preparation for both TRANSPORTATION CASKS and STCs.
HORIZONTAL STORAGE MODULE (HSM)	An HSM (Standardized HSM, AHSM or other models enveloped by these designs) is a reinforced concrete structure for storage of a CANISTER at a used fuel storage installation (e.g., Standardized HSM includes the HSM Model 80 and Model 102 as described in the SAR.)
WCS CONSOLIDATED INTERIM STORAGE FACILITY (CISF)	The WCS CISF is a complex designed and constructed for the interim storage of canisterized used nuclear fuel and other canisterized radioactive materials associated with used fuel. The canisterized material is stored within HSMs or VCCs.

(continued)

1.1 Definitions (continued)

LOADING OPERATIONS (for NUHOMS® Systems)	LOADING OPERATIONS for NUHOMS® Systems include all licensed activities associated with the horizontal raising or lowering of the CANISTER and STC from the transport conveyance to the transfer vehicle. LOADING OPERATIONS begin when the Impact Limiters are removed from the STC and end when the STC is ready for TRANSFER OPERATIONS.
LOADING OPERATIONS (for Vertical Systems)	LOADING OPERATIONS for Vertical Systems include all licensed activities associated with the VCT lifting the TRANSPORTATION CASK from the transport conveyance and placing in/“under” the CTS. LOADING OPERATIONS begin when the Impact Limiters are removed from the TRANSPORTATION CASK and end when the TRANSPORTATION CASK is ready for TRANSFER OPERATIONS.
OPERABLE	An OPERABLE VCC heat removal system transfers sufficient heat away from the fuel assemblies such that the fuel cladding, CANISTER component and CONCRETE CASK temperatures do not exceed applicable limits.
SAFE CONDITION AND FORECAST	*A safe condition and forecast is considered to be the absence of: Tornado and Severe Thunderstorm Watches, Tornado and Severe Thunderstorm Warnings, and predicted wind speeds that would qualify for a Severe Thunderstorm Watch (58 mph or greater).*
SHIPPING/TRANSFER CASK (STC)	A 10 CFR Part 71 licensed TRANSPORTATION CASK that is also licensed under 10 CFR Part 72 as a Transfer Cask will be used to transport the CANISTER to the WCS CISF and will be placed on a transfer vehicle for movement of a CANISTER to the HSM. (NUHOMS® Systems)
STORAGE OPERATIONS	STORAGE OPERATIONS include all licensed activities that are performed at the WCS CISF, while a CANISTER is located in an HSM or VCC on the storage pad within the WCS CISF perimeter. STORAGE OPERATIONS do not include CANISTER transfer between the STC and the HSM or transfer of the VCC between the CTS and storage pad.
TRANSFER CASK	TRANSFER CASK is a shielded device designed to hold the CANISTER during LOADING OPERATIONS, and UNLOADING OPERATIONS for the Vertical Systems.

(continued)

1.1 Definitions (continued)

TRANSFER OPERATIONS (NUHOMS® Systems)	TRANSFER OPERATIONS for NUHOMS® Systems include all licensed activities involving the movement of an STC loaded with a loaded CANISTER. TRANSFER OPERATIONS begin when the STC has been placed horizontal on the transfer vehicle ready for TRANSFER OPERATIONS and end when the CANISTER is located in an HSM on the storage pad within the WCS CISF perimeter. TRANSFER OPERATIONS include CANISTER transfer between the STC and the HSM.
TRANSFER OPERATIONS (Vertical Systems)	TRANSFER OPERATIONS for Vertical Systems include all licensed activities involved in using a TRANSFER CASK to move a loaded and sealed CANISTER.
TRANSPORT OPERATIONS (Vertical Systems)	TRANSPORT OPERATIONS for Vertical Systems include all licensed activities performed on a loaded VERTICAL CONCRETE CASK when it is being moved to and from its designated location on the storage pad. TRANSPORT OPERATIONS begin when the loaded VERTICAL CONCRETE CASK is placed on or lifted by a VCT and end when the CONCRETE CASK is set down in its storage position on the storage pad.
TRANSPORTATION CASK	A 10 CFR Part 71 licensed TRANSPORTATION CASK used to transport CANISTERS for the Vertical Systems.
UNLOADING OPERATIONS (NUHOMS® Systems)	UNLOADING OPERATIONS for NUHOMS® Systems include all licensed activities on a CANISTER to ready it for shipment off-site. UNLOADING OPERATIONS begin when the CANISTER and STC is removed from the transfer vehicle and end when the CANISTER and STC is loaded on the transport conveyance and is being prepared for transport.
UNLOADING OPERATIONS (Vertical Systems)	UNLOADING OPERATIONS for Vertical Systems include all licensed activities on a CANISTER to ready it for shipment off-site. UNLOADING OPERATIONS begin when the CANISTER is placed in the TRANSPORTATION CASK and end when the CANISTER and TRANSPORTATION CASK is loaded on the transport conveyance and is being prepared for transport.

(continued)

1.1 Definitions (continued)

VERTICAL CONCRETE CASK (VCC)	VERTICAL CONCRETE CASK is the cask that receives and holds a sealed CANISTER. It provides the gamma and neutron shielding and convective cooling of the spent fuel confined in the CANISTER.
VERTICAL CANISTER TRANSPORTER (VCT)	The VCT is used to move the TRANSPORTATION CASK within the cask handling building to or from the CTS. The VCT is also used to move the loaded VCC for TRANSPORT OPERATIONS.

1.0 USE AND APPLICATION

1.2 Logical Connectors

PURPOSE

The purpose of this section is to explain the meaning of logical connectors.

Logical connectors are used in Technical Specifications (TS) to discriminate between, and yet connect, Discrete Conditions, Required Actions, Completion Times, Surveillances, and Frequencies. The only logical connectors that appear in TS are AND and OR. The physical arrangement of these connectors constitutes logical conventions with specific meanings.

BACKGROUND

Several levels of logic may be used to state Required Actions. These levels are identified by the placement (or nesting) of the logical connectors and by the number assigned to each Required Action. The first level of logic is identified by the first digit of the number assigned to a Required Action and the placement of the logical connector in the first level of nesting (i.e., left justified with the number of the Required Action). The successive levels of logic are identified by additional digits of the Required Action number and by successive indentions of the logical connectors.

When logical connectors are used to state a Condition, Completion Time, Surveillance, or Frequency, only the first level of logic is used, and the logical connector is left justified with the statement of the Condition, Completion Time, Surveillance, or Frequency.

EXAMPLES

The following examples illustrate the use of logical connectors:

EXAMPLE 1.2-1

ACTIONS:

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. LCO (Limiting Condition for Operation) not met.	A.1 Verify… AND A.2 Restore…	

In this example the logical connector AND is used to indicate that when in Condition A, both Required Actions A.1 and A.2 must be completed.

(continued)

1.2 Logical Connectors (continued)

EXAMPLES (continued)

EXAMPLE 1.2-2

ACTIONS:

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. LCO not met.	A.1 Stop… OR A.2 A.2.1 Verify… AND A.2.2 A.2.2.1 Reduce… OR A.2.2.2 Perform… OR A.3 Remove…	

This example represents a more complicated use of logical connectors. Required Actions A.1, A.2, and A.3 are alternative choices, only one of which must be performed as indicated by the use of the logical connector OR and the left justified placement. Any one of these three Actions may be chosen. If A.2 is chosen, then both A.2.1 and A.2.2 must be performed as indicated by the logical connector AND. Required Action A.2.2 is met by performing A.2.2.1 or A.2.2.2. The indented position of the logical connector OR indicates that A.2.2.1 and A.2.2.2 are alternative choices, only one of which must be performed.

1.0 USE AND APPLICATION

1.3 Completion Times

PURPOSE	The purpose of this section is to establish the Completion Time convention and to provide guidance for its use.
BACKGROUND	Limiting Conditions for Operation (LCOs) specify the lowest functional capability or performance levels of equipment required for safe operation of the facility. The ACTIONS associated with an LCO state Conditions that typically describe the ways in which the requirements of the LCO are not met. Specified with each stated Condition are Required Action(s) and Completion Times(s).
DESCRIPTION	The Completion Time is the amount of time allowed for completing a Required Action. It is referenced to the time of discovery of a situation (e.g., equipment or variable not within limits) that requires entering an ACTIONS Condition unless otherwise specified, providing the facility is in a specified condition stated in the Applicability of the LCO. Required Actions must be completed prior to the expiration of the specified Completion Time. An ACTIONS Condition remains in effect and the Required Actions apply until the Condition no longer exists or the facility is not within the LCO Applicability. Once a Condition has been entered, subsequent subsystems, components, or variables expressed in the Condition, discovered to be not within limits, will <u>not</u> result in separate entry into the Condition unless specifically stated. The Required Actions of the Condition continue to apply to each additional failure, with Completion Times based on initial entry into the Condition.
EXAMPLES	The following examples illustrate the use of Completion Times with different types of Conditions and Changing Conditions.

<u>EXAMPLE 1.3-1</u>

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
B. Required Action and associated Completion Time not met.	B.1 Perform Action B.1 <u>AND</u> B.2 Perform Action B.2	12 hours 36 hours

(continued)

1.3 Completion Times (continued)

EXAMPLES (continued)

Condition B has two Required Actions. Each Required Action has its own separate Completion Time. Each Completion Time is referenced to the time that Condition B is entered.

The Required Actions of Condition B are to complete action B.1 within 12 hours AND complete action B.2 within 36 hours. A total of 12 hours is allowed for completing action B.1 and a total of 36 hours (not 48 hours) is allowed for completing action B.2 from the time that Condition B was entered. If action B.1 is completed within 6 hours, the time allowed for completing action B.2 is the next 30 hours because the total time allowed for completing action B.2 is 36 hours.

EXAMPLES

EXAMPLE 1.3-2

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One system not within limit.	A.1 Restore system to within limit.	7 days
B. Required Action and associated Completion Time not met.	B.1 Perform Action B.1. AND B.2 Perform Action B.2.	12 hours 36 hours

When a system is determined to not meet the LCO, Condition A is entered. If the system is not restored within 7 days, Condition B is also entered and the Completion Time clocks for Required Actions B.1 and B.2 start. If the system is restored after Condition B is entered, Condition A and B are exited, and therefore, the Required Actions of Condition B may be terminated.

(continued)

1.3 Completion Times (continued)

EXAMPLES (continued)

EXAMPLE 1.3-3

ACTIONS

---NOTE---

Separate Condition entry is allowed for each component.

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. LCO not met.	A.1 Restore compliance with LCO.	4 hours
B. Required Action and associated Completion Time not met.	B.1 Perform Action B.1. AND B.2 Perform Action B.2.	6 hours 12 hours

The Note above the ACTIONS Table is a method of modifying how the Completion Time is tracked. If this method of modifying how the Completion Time is tracked was applicable only to a specific Condition, the Note would appear in that Condition rather than at the top of the ACTIONS Table.

The Note allows Condition A to be entered separately for each component, and Completion Times tracked on a per component basis. When a component is determined to not meet the LCO, Condition A is entered and its Completion Time starts. If subsequent components are determined to not meet the LCO, Condition A is entered for each component and separate Completion Times start and are tracked for each component.

IMMEDIATE COMPLETION TIME

When "Immediately" is used as a Completion Time, the Required Action should be pursued without delay and in a controlled manner.

1.0 USE AND APPLICATION

1.4 Frequency

PURPOSE	The purpose of this section is to define the proper use and application of Frequency requirements
DESCRIPTION	Each Surveillance Requirement (SR) has a specified Frequency in which the Surveillance must be met in order to meet the associated Limiting Condition for Operation (LCO). An understanding of the correct application of the specified Frequency is necessary for compliance with the SR. The "Specified Frequency" is referred to throughout this section and each of the Specifications of Section 3.0, Limiting Condition for Operation (LCO) and Surveillance Requirement (SR) Applicability. The "Specified Frequency" consists of the requirements of the Frequency column of each SR, as well as certain Notes in the Surveillance column that modify performance requirements. Situations where a Surveillance could be required (i.e., its Frequency could expire), but where it is not possible or not desired that it be performed until sometime after the associated LCO is within its Applicability, represent potential SR 3.0.4 conflicts. To avoid these conflicts, the SR (i.e., the Surveillance or the Frequency) is stated such that it is only "required" when it can be and should be performed. With a SR satisfied, SR 3.0.4 imposes no restriction.

(continued)

1.4 Frequency (continued)

EXAMPLES

The following examples illustrate the various ways that Frequencies are specified:

EXAMPLE 1.4-1

SURVEILLANCE REQUIREMENTS

SURVEILLANCE	FREQUENCY
Verify pressure within limit.	12 hours

Example 1.4-1 contains the type of SR most often encountered in the Technical Specifications (TS). The Frequency specifies an interval (12 hours) during which the associated Surveillance must be performed at least one time. Performance of the Surveillance initiates the subsequent interval. Although the Frequency is stated as 12 hours, an extension of the time interval to 1.25 times the stated Frequency is allowed by SR 3.0.2 for operational flexibility. The measurement of this interval continues at all times, even when the SR is not required to be met per SR 3.0.1 (such as when the equipment is determined to not meet the LCO, a variable is outside specified limits, or the unit is outside the Applicability of the LCO). If the interval specified by SR 3.0.2 is exceeded while the facility is in a condition specified in the Applicability of the LCO, the LCO is not met in accordance with SR 3.0.1.

If the interval as specified by SR 3.0.2 is exceeded while the facility is not in a condition specified in the Applicability of the LCO for which performance of the SR is required, the Surveillance must be performed within the Frequency requirements of SR 3.0.2 prior to entry into the specified condition. Failure to do so would result in a violation of SR 3.0.4.

(continued)

1.4 Frequency (continued)

EXAMPLES (continued)

EXAMPLE 1.4-2

SURVEILLANCE REQUIREMENTS

SURVEILLANCE	FREQUENCY
Verify flow is within limits.	Once within 12 hours prior to starting activity AND 24 hours thereafter

Example 1.4-2 has two Frequencies. The first is a one-time performance Frequency, and the second is of the type shown in Example 1.4-1. The logical connector "AND" indicates that both Frequency requirements must be met. Each time the example activity is to be performed, the Surveillance must be performed prior to starting the activity.

The use of "once" indicates a single performance will satisfy the specified Frequency (assuming no other Frequencies are connected by "AND"). This type of Frequency does not qualify for the 25% extension allowed by SR 3.0.2.

"Thereafter" indicates future performances must be established per SR 3.0.2, but only after a specified condition is first met (i.e., the "once" performance in this example). If the specified activity is canceled or not performed, the measurement of both intervals stops. New intervals start upon preparing to restart the specified activity.

2.0 FUNCTIONAL AND OPERATING LIMITS

2.1 Functional and Operating Limits

Subject to the limitation of the last sentence of Condition 9 of this license SNM-1050, the used nuclear fuel to be stored in an HSM or VCC at the WCS CISF shall meet the Approved Contents requirements of one of the following:

2.1.1 NRC Materials License SNM-2510, Amendment 4.

2.1.2 Table 1-1c or Table 1-1j (NUHOMS® 61BT DSC) of Certificate of Compliance 1004 Appendix A Technical Specifications For The Standardized NUHOMS® Horizontal Modular Storage System, including Amendments 3 through 13 inclusive.

2.1.3 Table 1-1t (NUHOMS® 61BTH DSC) of Certificate of Compliance 1004 Appendix A Technical Specifications For The Standardized NUHOMS® Horizontal Modular Storage System, including Amendments 10 through 13 inclusive.

2.1.4 Section 2.1 (NUHOMS® 24PT1) of Certificate of Compliance 1029 Appendix A Technical Specifications For The Standardized Advanced NUHOMS® System Operating Controls And Limits, including Amendments 0, 1, and 3.

2.1.5 Section B 2.1 (NAC-MPC System) of Certificate of Compliance 1025 Appendix B Technical Specification For The NAC-MPC System Approved Contents and Design Features, including Amendments 0 through 6.

2.1.6 Section B 2.1.2, “Maine Yankee SITE SPECIFIC FUEL Preferential Loading,” (NAC-UMS System) of Certificate of Compliance 1015 Appendix B Technical Specification For The NAC-UMS System Approved Contents and Design Features, including Amendments 0 through 5.

2.1.7 Table B.2-1, “PWR Fuel,” (MAGNASTOR System) of Certificate of Compliance 1031 Appendix B Technical Specification For The MAGNASTOR System Approved Contents, including Amendments 0 through 3, Revision 1, and Amendments 4 and 5.

2.0 FUNCTIONAL AND OPERATING LIMITS

2.2 Functional and Operating Limits Violations

If any Functional and Operating Limit of 2.1 is violated, the following actions shall be completed:

2.2.1 The affected CANISTER shall be placed in a safe condition.

2.2.2 Within 24 hours of discovering the event, notify the NRC Operations Center of the violation.

2.2.3 Within 60 days, submit a special report which describes the cause of the violation and the actions taken to restore compliance and prevent recurrence.

3.0 LIMITING CONDITION FOR OPERATION (LCO) AND SURVEILLANCE REQUIREMENT (SR) APPLICABILITY

LIMITING CONDITION FOR OPERATION

LCO 3.0.1	LCOs shall be met during specified conditions in the Applicability, except as provided in LCO 3.0.2.
LCO 3.0.2	Upon discovery of a failure to meet an LCO, the Required Actions of the associated Conditions shall be met, except as provided in LCO 3.0.5. If the LCO is met or is no longer applicable prior to expiration of the specified Completion Time(s), completion of the Required Action(s) is not required, unless otherwise stated.
LCO 3.0.3	Not applicable to a spent fuel storage cask.
LCO 3.0.4	When an LCO is not met, entry into a specified condition in the Applicability shall not be made except when the associated ACTIONS to be entered permit continued operation in the specified condition in the Applicability for an unlimited period of time. This Specification shall not prevent changes in specified conditions in the Applicability that are required to comply with ACTIONS. Exceptions to this Specification are stated in the individual Specifications. These exceptions allow entry into specified conditions in the Applicability when the associated ACTIONS to be entered allow operation in the specified condition in the Applicability only for a limited period of time.
LCO 3.0.5	Equipment removed from service or not in service in compliance with ACTIONS may be returned to service under administrative control solely to perform testing required to demonstrate it meets the LCO or that other equipment meets the LCO. This is an exception to LCO 3.0.2 for the system returned to service under administrative control to perform the testing required to demonstrate that the LCO is met.
LCO 3.0.6	Not applicable to a spent fuel storage cask.
LCO 3.0.7	Not applicable to a spent fuel storage cask.

(continued)

SURVEILLANCE REQUIREMENTS

SR 3.0.1	SRs shall be met during the specified conditions in the Applicability for individual LCOs, unless otherwise stated in the SR. Failure to meet a Surveillance, whether such failure is experienced during the performance of the Surveillance or between performances of the Surveillance, shall be failure to meet the LCO. Failure to perform a Surveillance within the specified Frequency shall be failure to meet the LCO except as provided in SR 3.0.3. Surveillances do not have to be performed on equipment or variables outside specified limits.
SR 3.0.2	The specified Frequency for each SR is met if the Surveillance is performed within 1.25 times the interval specified in the Frequency, as measured from the previous performance or as measured from the time a specified condition of the Frequency is met. For Frequencies specified as "once," the above interval extension does not apply. If a Completion Time requires periodic performance on a "once per . . ." basis, the above Frequency extension applies to each performance after the initial performance. Exceptions to this Specification are stated in the individual Specifications.
SR 3.0.3	If it is discovered that a Surveillance was not performed within its specified Frequency, then compliance with the requirement to declare the LCO not met may be delayed, from the time of discovery, up to 24 hours or up to the limit of the specified Frequency, whichever is less. This delay period is permitted to allow performance of the Surveillance. If the Surveillance is not performed within the delay period, the LCO must immediately be declared not met, and the applicable Condition(s) must be entered. When the Surveillance is performed within the delay period and the Surveillance is not met, the LCO must immediately be declared not met, and the applicable Condition(s) must be entered.
SR 3.0.4	Entry into a specified condition in the Applicability of an LCO shall not be made unless the LCO's Surveillances have been met within their specified Frequency. This provision shall not prevent entry into specified conditions in the Applicability that are required to comply with ACTIONS.

3.0 Limiting Condition For Operation (continued)

3.1 Radiation Protection

3.1.1 SHIPPING/TRANSFER CASK Exterior Surface Contamination

LCO 3.1.1 Removable surface contamination on the STC shall not exceed:

a. 2,200 dpm/100 cm^2 from beta and gamma sources; and

b. 220 dpm/100 cm^2 from alpha sources.

APPLICABILITY: During LOADING OPERATIONS (NUHOMS® Systems)

ACTIONS:

-- NOTE --
Separate condition entry is allowed for each STC.

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. SHIPPING/TRANSFER CASK removable surface contamination limits not met.	A.1 Decontaminate the SHIPPING/TRANSFER CASK to bring the removable contamination to within limits	7 days <u>AND</u> Prior to TRANSFER OPERATIONS

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.1.1.1	Verify by either direct or indirect methods that the removable contamination on the exterior surfaces of the SHIPPING/TRANSFER CASK is within limits.	Once, prior to TRANSFER OPERATIONS.

3.2 NAC-MPC SYSTEM Integrity

3.2.1 CANISTER Maximum Time in the TRANSFER CASK

LCO 3.2.1 The CANISTER shall be transferred from the TRANSFER CASK to a VCC, or to a TRANSPORTATION CASK.

APPLICABILITY: During TRANSFER OPERATIONS and prior to TRANSPORT OPERATIONS (NAC MPC Systems)

ACTIONS:

--- NOTE ---

Separate condition entry is allowed for each NAC-MPC SYSTEM. *Prior to the beginning of TRANSFER OPERATIONS, a call to the National Weather Service (NWS) shall be conducted to ensure a SAFE CONDITION AND FORECAST within the next 8 hours. If there is no inclement weather forecasted for the next 8 hours, TRANSFER OPERATIONS can be conducted. However if TRANSFER OPERATIONS are not completed before 2 hours remain in the transfer time window, an additional call to the NWS shall be conducted to verify an additional 8 hours can be added to the transfer time window. This can be repeated as-needed to complete the TRANSFER OPERATIONS provided the transfer time window does not conflict with any CONDITION and COMPLETION TIME in this LCO. Alternatively if 2 hours remain, a call to the NWS does not need to be made provided the TRANSFER OPERATIONS can be completed within 2 hours.*

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. CANISTER transfer not completed.	A.1 Complete CANISTER TRANSFER OPERATIONS	25 days
B. Required Action and associated completion time not met	B.1 Return CANISTER to TRANSPORTATION CASK or VCC	5 days

SURVEILLANCE REQUIREMENTS

SURVEILLANCE	FREQUENCY
SR 3.2.1.1 Verify CANISTER transfer completed	Once within 25 days.

3.2 NAC-MPC SYSTEM Integrity

3.2.2 VCC Heat Removal System

LCO 3.2.2 The VCC Heat Removal System shall be OPERABLE. The VCC heat removal system is considered OPERABLE if the difference between the WCS CISF ambient temperature and the average outlet air temperature is ≤ 92°F for the YANKEE-MPC and for the MPC-LACBWR; or ≤ 110°F for the CY-MPC, or if all four air inlet and outlet screens are visually verified to be unobstructed. Failing this, a VCC heat removal system may be declared OPERABLE if an engineering evaluation determines the VCC has adequate heat transfer capabilities to assure continued spent nuclear fuel, CANISTER and VCC integrity.

APPLICABILITY: During STORAGE OPERATIONS (NAC MPC Systems)

ACTIONS:

-- NOTE --
Separate condition entry is allowed for each NAC-MPC SYSTEM.

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. LCO not met	A.1 Restore VCC Heat Removal System to OPERABLE status	8 hours
B. Required Action A.1 and associated completion time not met	B.1 Perform SR 3.2.2.1	Immediately and every 6 hours thereafter
	<u>AND</u>	
	B.2.1 Perform an engineering evaluation to determine that the VCC Heat Removal System is OPERABLE	12 hours
	<u>OR</u>	
	B.2.2 Place the NAC-MPC SYSTEM in a safe condition	12 hours

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.2.2.1	Verify the difference between the average VCC air outlet temperature and WCS CISF ambient temperature is ≤92°F for the YANKEE-MPC CANISTER and the MPC-LACBWR CANISTER or ≤110°F for the CY-MPC CANISTER	24 hours
	OR	
	Visually verify all four air inlet and outlet screens are unobstructed	24 hours.

3.3 NAC-UMS® SYSTEM Integrity

3.3.1 CANISTER Maximum Time in the TRANSFER CASK

LCO 3.3.1 The CANISTER shall be transferred from the TRANSFER CASK to a VCC, or to a TRANSPORTATION CASK.

APPLICABILITY: During TRANSFER OPERATIONS and prior to TRANSPORT OPERATIONS (NAC UMS® Systems)

ACTIONS:

--- NOTE ---

Separate condition entry is allowed for each NAC-UMS® SYSTEM. *Prior to the beginning of TRANSFER OPERATIONS, a call to the National Weather Service (NWS) shall be conducted to ensure a SAFE CONDITION AND FORECAST within the next 8 hours. If there is no inclement weather forecasted for the next 8 hours, TRANSFER OPERATIONS can be conducted. However if TRANSFER OPERATIONS are not completed before 2 hours remain in the transfer time window, an additional call to the NWS shall be conducted to verify an additional 8 hours can be added to the transfer time window. This can be repeated as-needed to complete the TRANSFER OPERATIONS provided the transfer time window does not conflict with any CONDITION and COMPLETION TIME in this LCO. Alternatively if 2 hours remain, a call to the NWS does not need to be made provided the TRANSFER OPERATIONS can be completed within 2 hours.*

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. 600 hour cumulative time limit not met	A.1 Load CANISTER into VCC	5 days
	<u>OR</u>	
	A.2 Load CANISTER into TRANSPORTATION CASK	5 days

SURVEILLANCE REQUIREMENTS

SURVEILLANCE	FREQUENCY
SR 3.3.1.1 Monitor elapsed time for compliance with LCO 3.3.1	As required to meet the time limit.

3.3 NAC-UMS® SYSTEM Integrity

3.3.2 VCC Heat Removal System

LCO 3.3.2

The VCC Heat Removal System shall be OPERABLE. The VCC heat removal system is considered OPERABLE if the difference between the ISFSI ambient temperature and the average outlet air temperature is ≤102°F for the PWR CANISTER, or if all four air inlet and outlet screens are visually verified to be unobstructed. Failing this, a VCC heat removal system may be declared OPERABLE if an engineering evaluation determines the VCC has adequate heat transfer capabilities to assure continued spent nuclear fuel and CANISTER integrity.

APPLICABILITY: During STORAGE OPERATIONS (NAC UMS® Systems)

ACTIONS:

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

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. LCO not met	A.1 Ensure adequate heat removal to prevent exceeding short-term temperature limits	Immediately
	<u>AND</u>	
	A.2 Restore VCC Heat Removal System to OPERABLE status	25 days
B. Required Action A.1 or A.2 and associated completion time not met	B.1 Perform an engineering evaluation to determine that the VCC Heat Removal System is OPERABLE	5 days
	<u>OR</u>	
	B.2 Place the NAC-UMS SYSTEM in a safe condition	5 days

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.3.2.1	Verify the difference between the WCS CISF ambient temperature and the average outlet air outlet temperature is ≤102°F for the PWR CANISTER	24 hours
	OR	
	Visually verify all four air inlet and outlet screens are unobstructed	24 hours.
SR 3.3.2.2	Verify the difference between the WCS CISF ambient temperature and the average outlet air outlet temperature is ≤102°F for the PWR CANISTER	Once between 5 and 30 days after STORAGE OPERATIONS begin

3.4 MAGNASTOR SYSTEM Integrity

3.4.1 CANISTER Maximum Time in the TRANSFER CASK

LCO 3.4.1

The maximum time a CANISTER can remain in the MAGNASTOR TRANSFER CASK without the active cooling system running is shown below for the initial and subsequent transfer attempts. If the initial transfer attempt cannot be completed within the time limits shown in Table A, then subsequent transfer attempts shall comply with the time limits in Table B after the Required Actions in Condition A are met.

This time frame starts from the time a loaded MAGNATRAN TRANSPORTATION CASK is received and the MAGNATRAN TRANSPORTATION CASK is no longer in the horizontal orientation until the CANISTER is placed on the pedestal in a VCC. Likewise, this time frame also starts from the time a loaded CANISTER is lifted off the VCC pedestal until it is placed in the MAGNATRAN TRANSPORTATION CASK and the MAGNATRAN TRANSPORTATION CASK is placed in the horizontal orientation.

A. Initial Transfer Attempt Time Limits

Total PWR Heat Load (kW)	Maximum CANISTER Transfer Time (hours)
≤23	41

B. Subsequent Transfer Attempt Time Limits

Total PWR Heat Load (kW)	Maximum CANISTER Transfer Time (hours)
≤23	31

APPLICABILITY: During LOADING OPERATIONS, TRANSFER OPERATIONS or UNLOADING OPERATIONS (NAC MAGNASTOR® Systems)

3.4.1 CANISTER Maximum Time in the TRANSFER CASK

ACTIONS:

-- NOTE --

Separate condition entry is allowed for each MAGNASTOR® SYSTEM. *Prior to the beginning of TRANSFER OPERATIONS, a call to the National Weather Service (NWS) shall be conducted to ensure a SAFE CONDITION AND FORECAST within the next 8 hours. If there is no inclement weather forecasted for the next 8 hours, TRANSFER OPERATIONS can be conducted. However if TRANSFER OPERATIONS are not completed before 2 hours remain in the transfer time window, an additional call to the NWS shall be conducted to verify an additional 8 hours can be added to the transfer time window. This can be repeated as-needed to complete the TRANSFER OPERATIONS provided the transfer time window does not conflict with any CONDITION and COMPLETION TIME in this LCO. Alternatively if 2 hours remain, a call to the NWS does not need to be made provided the TRANSFER OPERATIONS can be completed within 2 hours.*

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. CANISTER transfer time limit not met.	A.1 Return the loaded CANISTER to the MAGNASTOR TRANSFER CASK	Immediately
	<u>AND</u>	
	A.2 Initiate the MAGNASTOR TRANSFER CASK active cooling system.	Immediately
	<u>AND</u>	
	A.3 Maintain the MAGNASTOR TRANSFER CASK active cooling system for a minimum of 24 hours	24 hours

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.4.1.1	Monitor elapsed time that a loaded CANISTER is not sitting on a VCC pedestal or in a MAGNATRAN TRANSPORTATION CASK that is not in the horizontal orientation and while the MAGNASTOR TRANSFER CASK active cooling system is not in operation.	Continuous during TRANSFER OPERATIONS and prior to TRANSPORT OPERATIONS.

3.4 MAGNASTOR SYSTEM Integrity

3.4.2 VCC Heat Removal System

LCO 3.4.2 The VCC Heat Removal System shall be OPERABLE.

APPLICABILITY: During STORAGE OPERATIONS (MAGNASTOR Systems)

ACTIONS:

--- NOTE ---
Separate condition entry is allowed for each MAGNASTOR SYSTEM.

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. VCC Heat Removal System inoperable	A.1 Ensure adequate heat removal to prevent exceeding short-term temperature limits	Immediately
	AND	
	A.2 Restore VCC Heat Removal System to OPERABLE status	30 days

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.4.2.1	Verify the difference between the average VCC air outlet temperature and the WCS CISF ambient temperature indicates that the VCC Heat Removal System is operable in accordance with the MAGNASTOR thermal evaluation.	24 hours
	OR	
	Visually verify all VCC air inlet and outlet screens are free of blockage	24 hours.

4.0 DESIGN FEATURES

The specifications in this section include the design characteristics of special importance to each of the physical barriers and to the maintenance of safety margins in the WCS CISF design.

4.1 Site

The WCS CISF is located approximately 30 miles west of the City of Andrews, Texas, and five miles east of the City of Eunice, New Mexico. The WCS CISF is located approximately one-half mile east of the Texas-New Mexico boundary and approximately one mile north of Texas State Highway 176.

4.2 Storage System Features

4.2.1 Storage Systems

The WCS CISF is licensed to store spent fuel and GTCC waste in various NUHOMS® System HSMs. Each CANISTER shall be loaded at a 10 CFR Part 50 licensee's facility in accordance with one of the following 10 CFR Part 72 Materials License or Certificates of Compliance (CoC):

- SNM-2510, or
- CoC No. 1004, or
- CoC No. 1029

and shipped to the WCS CISF in a 10 CFR Part 71 certified shipping package (the STC). The CANISTER shall be transferred directly from the STC to the HSM at the Storage Pad.

In addition, the WCS CISF is licensed to store spent fuel and GTCC waste in various NAC VCCs, which include VCCs for the NAC-MPC, NAC-UMS, and MAGNASTOR. Each CANISTER shall be loaded at a 10 CFR Part 50 licensee's facility in accordance with one of the following 10 CFR Part 72 Certificates of Compliance (CoC):

- CoC No. 1025, or
- CoC No. 1015, or
- CoC No. 1031

and shipped to the WCS CISF in a 10 CFR Part 71 certified TRANSPORTATION CASK. The CANISTER shall be transferred from the TRANSPORTATION CASK to the VCC with the CTS and the VCC and CANISTER will be transferred from the CTS to the Storage Pad with the VCT.

4.2.2 Storage Capacity

The total storage capacity of the WCS CISF is limited to the material defined in Conditions 8A and 8B of the license. This total capacity of spent fuel assemblies is in the form of intact fuel assemblies, damaged fuel assemblies, failed fuel assemblies and fuel debris, as defined in SNM-2510; CoC No. 1004; CoC No. 1029, CoC No. 1025, CoC No. 1015, and CoC No. 1031.

(continued)

4.0 Design Features (continued)

4.3 Storage Area Design Features

The following storage location design features and parameters shall be implemented at the WCS CISF.

4.3.1 Storage Configuration

HSMs are placed together in single rows or back-to-back arrays. An end shield wall is placed on the outside end of any loaded outside HSM. A rear shield wall is placed on the rear of any single row loaded HSM.

The VCCs for NAC-MPC, NAC-UMS, and MAGNASTOR Systems shall meet the minimum center-to-center spacing requirements presented in the SAR.

4.3.2 Concrete Storage Pad Properties to Limit CANISTER Gravitational Loadings Due to Postulated Drops

The STCs with NUHOMS® CANISTERs have been evaluated for drops of up to 80 inches onto a reinforced concrete storage pad.

For concrete storage pads loaded with NAC-MPC, NAC-UMS, and/or MAGNASTOR VCC systems, the storage pad shall meet the concrete storage pad properties presented in CoC No. 1025, Section B 3.4, CoC No. 1015, Section B 3.4, and CoC No. 1031, Sections 4.3.1 and 5.4.

4.4 Cask Receipt and CTS

4.4.1 Lifting

Vertical lifting of the STC with a NUHOMS® CANISTER is not allowed. Horizontal lifting of the TRANSPORTATION CASK or TRANSFER CASK with an NAC-MPC, NAC-UMS or MAGNASTOR CANISTER is not allowed.

Lifting of a loaded TRANSPORTATION CASK, TRANSFER CASK, or VCC with an NAC-MPC, NAC-UMS or MAGNASTOR CANISTER shall be performed with the CHB CRANES, CTS, or VCT in accordance with the guidelines of NUREG-0612, “Control of Heavy Loads at Nuclear Power Plants,” July 1980. The lifting devices used with the CHB CRANES, CTS, and VCT shall be designed, fabricated, operated, tested, inspected, and maintained in accordance with the guidelines of NUREG-0612 with the following clarifications.

- The CTS shall be classified as a Type 1 crane in accordance with ASME NOG-1, 2015. Load Combinations and allowable stresses used in the CTS structural design shall be in accordance with ASME NOG-1. The CTS shall be designed, fabricated, operated, tested, inspected, and maintained in accordance with the guidelines of NUREG-0612. The specific applicable standard being applied to each primary gantry system component is as follows:

  - Hydraulic Locking Telescoping Boom Gantry Leg Assemblies on Self Propelled Dollies – ASME B30.1
  - Lift Beams (spanning the Telescoping Gantry Leg Assemblies) – ASME NOG-1 for design, fabrication, and initial testing; ANSI N14.6 for testing, inspection, and maintenance

4.0 Design Features (continued)

- Trolley Beam (spanning the Lift Beams & also mounted on Self Propelled Dollies) - ASME NOG-1 for design, fabrication, and initial testing; ANSI N14.6 for testing, inspection, and maintenance
- Standard Lift Links - ASME B30.26
- Standard Shackles - ASME B30.26
- Standard Slings - ASME B30.9
- Transfer Cask Lift Plates - ANSI N14.6
- Air Operated Chain Hoist (suspended from Trolley Beam) – ASME NUM-1, Type 1-B for design, fabrication, and initial testing; ASME B30.16 for testing, inspection, and maintenance
- Canister Lift Adapter (which mates with canister) – ANSI N14.6

• The VCT with TRANSPORTATION CASK lifting devices shall be designed, fabricated, operated, tested, inspected and maintained in accordance with the guidance of NUREG-0612, Section 5.1. The specific applicable standard being applied to each primary VCT is as follows:

  - Hydraulic Locking Telescoping Boom Assemblies – ASME B30.1
  - Lift Beam(s) (spanning the Telescoping Boom Assemblies) ANSI N14.6
  - Cask Lift Links - ANSI N14.6

• The CHB CRANES with TRANSPORTATION CASK lifting devices shall be designed, fabricated, operated, tested, inspected and maintained in accordance with the guidance of NUREG-0612, Section 5.1. The specific applicable standard being applied to each crane is as follows:

  - Crane structure and main hoist system: ASME NOG-1, 2015 Type I for design, fabrication and initial testing; ASME B30.2 for operation, testing, inspection, and maintenance
  - Cask Lifting Devices - ANSI N14.6

4.4.2 Post-transportation Verification

The design and licensing basis analysis provides reasonable assurance of the confinement effectiveness of the canisters allowed for storage at the WCS CISF. The confinement boundary of each canister type authorized for storage at the WCS CISF is evaluated to demonstrate that the loads during normal conditions of transport (NCT) do not exceed ASME B&PV Subsection NB Article NB-3200 (level A allowable). In addition, a Post-Transportation Verification shall include (1) visual inspection on a minimum of two bounding canisters from each site of origin, and (2) helium leak test on all canisters shipped to the WCS CISF.

• Criteria used to screen and select the two bounding canisters from each reactor site are based on the canister susceptibility assessment criteria developed in the Electric Power Research Institute (EPRI) report, Susceptibility Assessment Criteria for Chloride-Induced Stress Corrosion Cracking (CISCC) of Welded Stainless Steel Canisters for Dry Cask Storage Systems (Report No. 3002005371).

4.0 Design Features (continued)

- Personnel performing visual examinations shall be qualified and certified in accordance with the American Society of Mechanical Engineers (ASME) Code Section XI, IWA 2300, Visual Examination, Personnel Qualification and the Responsible Individual, including the requirements of ASME XI, Appendix VI, Rounded Indications, latest edition.

- Post transportation leakage testing shall comply with ANSI N 14.5 – 1997, “American National Standard for Radioactive Materials – Leakage Tests on Package for Shipment.”

- Post transportation leakage testing shall be conducted in accordance with approved procedures by a Nondestructive Testing (NDT) Level III specialist or examiner.

- Personnel performing post transport leak testing shall be certified as LT Level II, or LT Level III in accordance with the American Society for Nondestructive Testing (ASNT) Practice No. SNT-TC-1A, Personnel Qualification and Certification in Nondestructive Testing, up to the 2006 edition as permitted by the 2013 Code Edition.

4.5 Design Basis Site Specific Parameters and Analyses

The potential for fire and explosion shall be addressed by limiting the amount of flammable liquids during LOADING OPERATIONS below the fire load limits for the respective systems in the SAR. This includes the condition that the fuel tank of the cask handling equipment used to move the loaded VCC onto or from the Storage Pads contains no more than 50 gallons of fuel and no more than 300 gallons for the NUHOMS® Systems.

5.0 ADMINISTRATIVE CONTROLS

5.1 Programs

Interim Storage Partners shall implement the following programs to ensure the safe operation and maintenance of the WCS CISF:

- Radiological Environmental Monitoring Program (see 5.1.1 below)
- Radiation Protection Program (see 5.1.2 below)
- HSM Thermal Monitoring Program (see 5.1.3 below)

5.1.1 Radiological Environmental Monitoring Program

a. A radiological environmental monitoring program will be implemented to ensure that the annual dose equivalent to an individual located outside the WCS CISF controlled area does not exceed the annual dose limits specified in 10 CFR 72.104(a).

b. Operation of the WCS CISF will not create any radioactive materials or result in any credible liquid or gaseous effluent release.

5.1.2 Radiation Protection Program

a. The Radiation Protection Program will establish administrative controls to limit personnel exposure to As Low As Reasonably Achievable (ALARA) levels in accordance with 10 CFR Part 20 and Part 72.

b. Dosimetry will be used to monitor direct radiation around the WCS CISF.

c. In accordance with 10 CFR 72.44(d), a periodic report will be submitted specifying the quantity of each of the principal radionuclides released to the environment in liquid and gaseous effluents during the previous calendar year of operation.

(continued)

5.0 Administrative Controls (continued)

5.1.3 HSM Thermal Monitoring Program

This program provides guidance for temperature measurements that are used to monitor the thermal performance of each HSM. The intent of the program is to prevent conditions that could lead to exceeding the concrete and fuel clad temperature criteria. Each user must implement TS 5.1.3(a).

a. Daily Visual Inspection of HSM Inlets and Outlets (Front Wall and Roof Birdscreens)

The user shall develop and implement procedures to perform visual inspection of HSM inlets and outlets on a daily basis. There is a possibility that the HSM air inlet and outlet openings could become blocked by debris, as postulated and analyzed in the SAR accident analyses for air vent blockage. The procedures shall ensure that blockage will not exist for periods longer than assumed in the SAR analyses.

Perform a daily visual inspection of the air vents to ensure that HSM air vents are not blocked for more than 40 hours. If visual inspection indicates blockage, clear air vents and replace or repair birdscreens if damaged. If the air vents are blocked or could have been blocked for more than 40 hours, evaluate existing conditions in accordance with the site corrective action program to confirm that conditions adversely affecting the concrete or fuel cladding do not exist.

5.1.4 Corrective Action Program

If a non-conforming canister is found during the receipt inspection, the canister shall be placed in a safe condition and a corrective action will be initiated in accordance with the licensee's approved quality assurance program.

The corrective action shall address the regulatory requirements for reporting to the appropriate agency, including the deadlines for such notification and the appropriate licensing actions initiated to resolve the situation. The corrective actions shall include, but are not limited to the following:

- Notify the NRC as required, conferring with the NRC as needed.
- Maintain the canister inside the transportation cask in its transportation configuration until appropriate corrective actions are determined. The safety for temporary storage will be confirmed using Part 71 analysis as appropriate.
- Develop an action plan with a time frame which will include input from the NRC discussion.
- Obtain NRC's approvals as necessary.
- Proceed with corrective actions.

The timeline by which a canister will be returned to the place of origin, or other facility licensed for canister operations, will depend on the specific corrective actions required to address the condition identified by the corrective action evaluation performed.

(continued)

5.0 Administrative Controls (continued)

5.2 Lifting Controls

5.2.1 Lifting Height and Temperature Limits

The requirements of TS 4.4 apply to the CHB CRANES, VCT, and CTS and associated lifting devices. Confirm the surface temperature of the STC or TRANSPORTATION CASK is above 0 °F before beginning LOADING OPERATIONS and UNLOADING OPERATIONS

The lifting height of a STC, TRANSPORTATION CASK with CANISTER, or TRANSFER CASK with CANISTER is limited as a function of low temperature and the type of lifting/handling device, as follows:

- No lifts or handling of the STC or TRANSFER CASK with CANISTER at any height are permissible at STC or TRANSFER CASK surface temperatures below 0 °F.
- The maximum lift height of the STC with CANISTER shall be 80 inches if the surface temperature of the SHIPPING/TRANSFER CASK is above 0 °F and a non-single failure proof lifting/handling device is used.
- For vertical cask systems, LOADING OPERATIONS, TRANSFER OPERATIONS, and UNLOADING OPERATIONS shall be conducted using a single failure proof lifting/handling system.
- No lift height restriction is imposed on the STC, TRANSPORTATION CASK with CANISTER, or TRANSFER CASK with CANISTER if the STC or TRANSFER CASK or TRANSPORTATION CASK surface temperature is higher than 0 °F and a single failure proof lifting/handling system is used.

The requirements of 10 CFR Part 72 apply when the STC with CANISTER is in a horizontal orientation on the transfer vehicle.

The VCC loaded with an NAC-MPC, NAC-UMS, or MAGNASTOR CANISTER is not permitted to be lifted greater than 6 inches, 24 inches, and 24 inches in the vertical direction, respectively, and shall be transported by the VCT.

5.2.2 Cask Drop

<u>Inspection Requirement</u>

The NUHOMS® CANISTER will be inspected for damage after any STC with CANISTER side drop of 15 inches or greater.

<u>Safety Analysis</u>

The analysis of bounding drop scenarios shows that the STC will maintain the structural integrity of the CANISTER confinement boundary from an analyzed side drop height of 80 inches. The 80-inch drop height envelopes the maximum height from the bottom of the STC when secured to the transfer vehicle while enroute to the HSM.

(continued)

5.0 Administrative Controls (continued)

Although analyses performed for cask drop accidents at various orientations indicate much greater resistance to damage, requiring the inspection of the CANISTER after a side drop of 15 inches or greater ensures that:

1. The CANISTER will continue to provide confinement.
2. The STC can continue to perform its design function regarding CANISTER transfer and shielding.

5.3 Concrete Testing

HSM concrete shall be tested during the fabrication process for elevated temperatures to verify that there are no significant signs of spalling or cracking and that the concrete compressive strength is greater than that assumed in the structural analysis. Tests shall be performed at or above the calculated peak temperature and for a period no less than the 40 hour duration of HSM blocked vent transient for components exceeding 500 °F.

HSM concrete temperature testing shall be performed whenever:

- There is a change in the supplier of the cement, or
- There is a change in the source of the aggregate, or
- The water-cement ratio changes by more than 0.04.

Enclosure 3 to 58104

SAR Change Pages (Proprietary)
Withheld Pursuant to 10 CFR 2.390

Enclosure 4 to 58104

SAR Change Pages

(Public)

- All waste stored within the various GTCC canisters will be in the physical form of activated metals that may have surface contamination. The GTCC canisters will not contain process wastes containing paper, plastics or ion exchange resins that could result in the generation of combustible gases or chemical or galvanic corrosion reactions with the canister.

Aging Management considerations for the canisters and storage overpacks are discussed in Section 11.5.

1.2.4.1 Use of NRC Approved Storage Cask Systems

For Phase 1 of the ISP application, canisterized spent nuclear fuel and GTCC waste are stored at the WCS CISF in six cask storage systems previously approved by the NRC. The six storage systems used at the WCS CISF during Phase 1 are:

1. NUHOMS® MP187 Storage System as Configured for the WCS CISF

   NUHOMS® MP187 Cask Storage System as configured for the WCS CISF is described in "Rancho Seco Independent Spent Fuel Storage Installation Safety Analysis Report" Revision 4, NRC Docket No. 72-11. This configuration includes the overpack and canisters included in NRC SNM License 2510, Amendment 4. Specifically, the NUHOMS® MP187 Storage System will use the HSM (Model 80) overpack to house one of three types of approved spent fuel canisters, the FO-DSC, FC-DCS or FF-DSC. The contents of the NUHOMS® MP187 Storage System during Phase 1 are those contents currently authorized in NRC SNM License 2510, Amendment 4.

2. Standardized *Advanced* NUHOMS® Storage System as Configured for the WCS CISF

   Standardized *Advanced* NUHOMS® Storage System as configured for the WCS CISF is described in "Updated Final Safety Analysis Report for the Standardized Advanced NUHOMS® Horizontal Modular Storage System for Irradiated Nuclear Fuel" TN Americas Document No. ANUH-01.0150, Revision 6, NRC Docket No. 72-1029. This configuration includes the overpack and canister included in NRC Certificate of Compliance 72-1029, Amendments 0, 1, and 3. Specifically, the Standardized *Advanced* NUHOMS® Storage System will use the AHSM overpack to house the NUHOMS® 24PT1 spent fuel canister. The contents of the Standardized *Advanced* NUHOMS® Storage System during Phase 1 are those contents currently authorized in NRC Certificate of Compliance 72-1029, Amendments 0, 1, and 3.

All Indicated Changes are for Consistency

Table 1-1
Storage Systems at the WCS CISF

Cask System	NRC Docket No.	Canister	Overpack
NUHOMS® MP187 Cask System	71-9255 72-11 (SNM-2510)	FO-DSC	HSM (Model 80)
		FC-DSC	
		FF-DSC	
		GTCC Canister	
Standardized *Advanced* NUHOMS® System	71-9255 72-1029	NUHOMS® 24PT1	AHSM
Standardized NUHOMS® System	71-9302 72-1004	NUHOMS® 61BT	HSM Model 102
		NUHOMS® 61BTH Type 1	
NAC-MPC	71-9235 72-1025	Yankee Class	VCC
		Connecticut Yankee	
		LACBWR	
		GTCC-Canister-CY	
		GTCC-Canister-YR	
NAC-UMS	71-9270 72-1015	Classes 1 through 5	VCC
		GTCC-Canister-MY	
MAGNASTOR	71-9356 72-1031	TSC1 through TSC4	CC1 through CC4
		GTCC-Canister-ZN	

All Indicated Changes are for Consistency

Table 1-4
Table of Topical Reports (SARs) Incorporated by Reference
(3 pages)

Chapter	Description	Applicable SARs (Docket Number)
01	INTRODUCTION AND GENERAL DESCRIPTION OF INSTALLATION	Section 1.6 (1.6 Material Incorporated by Reference)
A.3	Appendix A.3 - Design Criteria for NUHOMS® MP187 System	72-11 71-9255
B.3	Appendix B.3 - Design Criteria for Standardized *Advanced* NUHOMS® System	72-1029 72-11 71-9255
C.3	Appendix C.3 - Design Criteria for Standardized NUHOMS® System 61BT	72-1004 71-9302
D.3	Appendix D.3 - Design Criteria for Standardized NUHOMS® System 61BTH	72-1004 71-9302
E.3	Appendix E.3 - Design Criteria for NAC-MPC	72-1025
F.3	Appendix F.3 - Design Criteria for NAC-UMS	72-1015
G.3	Appendix G.3 - Design Criteria for NAC-MAGNASTOR	72-1031
A.4	Appendix A.4 - Operating Systems for NUHOMS® MP187 System	72-11
B.4	Appendix B.4 - Operating Systems for Standardized *Advanced* NUHOMS® System	72-1029
C.4	Appendix C.4 - Operating Systems for Standardized NUHOMS® System 61BT	72-1004
D.4	Appendix D.4 - Operating Systems for Standardized NUHOMS® System 61BTH	72-1004
E.4	Appendix E.4 - Operating Systems for NAC-MPC	72-1025
F.4	Appendix F.4 - Operating Systems for NAC-UMS	72-1015
G.4	Appendix G.4 - Operating Systems for NAC-MAGNASTOR	72-1031
A.7	Appendix A.7 - Structural Evaluation for NUHOMS® MP187 System	72-11 71-9255
B.7	Appendix B.7 - Structural Evaluation for Standardized *Advanced* NUHOMS® System	72-1029 72-11 71-9255
C.7	Appendix C.7 - Structural Evaluation for Standardized NUHOMS® System 61BT	72-1004 71-9302
D.7	Appendix D.7 - Structural Evaluation for Standardized NUHOMS® System 61BTH	72-1004 71-9302
E.7	Appendix E.7 - Structural Evaluation for NAC-MPC	72-1025

All Indicated Changes are for Consistency

Table 1-4
Table of Topical Reports (SARs) Incorporated by Reference
(3 pages)

Chapter	Description	Applicable SARs (Docket Number)
F.7	Appendix F.7 - Structural Evaluation for NAC-UMS	72-1015
G.7	Appendix G.7 - Structural Evaluation for NAC-MAGNASTOR	72-1031
A.8	Appendix A.8 - Thermal Evaluation for NUHOMS® MP187 System	72-11 71-9255
B.8	Appendix B.8 - Thermal Evaluation for Standardized *Advanced* NUHOMS® System	72-1029 72-11 71-9255
C.8	Appendix C.8 - Thermal Evaluation for Standardized NUHOMS® System 61BT	72-1004 71-9302
D.8	Appendix D.8 - Thermal Evaluation for Standardized NUHOMS® System 61BTH	72-1004 71-9302
E.8	Appendix E.8 - Thermal Evaluation for NAC-MPC	72-1025
F.8	Appendix F.8 - Thermal Evaluation for NAC-UMS	72-1015
G.8	Appendix G.8 - Thermal Evaluation for NAC-MAGNASTOR	72-1031
A.9	Appendix A.9 - Radiation Protection for NUHOMS® MP187 System	72-11 71-9255
B.9	Appendix B.9 - Radiation Protection for Standardized *Advanced* NUHOMS® System	72-1029 71-9255
C.9	Appendix C.9 - Radiation Protection for Standardized NUHOMS® System 61BT	72-1004 71-9302
D.9	Appendix D.9 - Radiation Protection for Standardized NUHOMS® System 61BTH	72-1004 71-9302
E.9	Appendix E.9 - Radiation Protection for NAC-MPC	72-1025
F.9	Appendix F.9 - Radiation Protection for NAC-UMS	72-1015
G.9	Appendix G.9 - Radiation Protection for NAC-MAGNASTOR	72-1031
A.10	Appendix A.10 - Criticality Evaluation for NUHOMS® MP187 System	72-11
B.10	Appendix B.10 - Criticality Evaluation for Standardized *Advanced* NUHOMS® System	72-1029
C.10	Appendix C.10 - Criticality Evaluation for Standardized NUHOMS® System 61BT	72-1004
D.10	Appendix D.10 - Criticality Evaluation for Standardized NUHOMS® System 61BTH	72-1004
E.10	Appendix E.10 - Criticality Evaluation for NAC-MPC	72-1025

All Indicated Changes are for Consistency

Table 1-4
Table of Topical Reports (SARs) Incorporated by Reference
(3 pages)

Chapter	Description	Applicable SARs (Docket Number)
F.10	Appendix F.10 - Criticality Evaluation for NAC-UMS	72-1015
G.10	Appendix G.10 - Criticality Evaluation for NAC-MAGNASTOR	72-1031
A.11	Appendix A.11 - Confinement Evaluation for NUHOMS® MP187 System	72-11
B.11	Appendix B.11 - Confinement Evaluation for Standardized *Advanced* NUHOMS® System	72-1029
C.11	Appendix C.11 - Confinement Evaluation for Standardized NUHOMS® System 61BT	72-1004
D.11	Appendix D.11 - Confinement Evaluation for Standardized NUHOMS® System 61BTH	72-1004
E.11	Appendix E.11 - Confinement Evaluation for NAC-MPC	72-1025
F.11	Appendix F.11 - Confinement Evaluation for NAC-UMS	72-1015
G.11	Appendix G.11 - Confinement Evaluation for NAC-MAGNASTOR	72-1031
A.12	Appendix A.12 - Accident Analyses for NUHOMS® MP187 System	72-11 71-9255
B.12	Appendix B.12 - Accident Analyses for Standardized *Advanced* NUHOMS® System	72-1029 72-11 71-9255
C.12	Appendix C.12 - Accident Analyses for Standardized NUHOMS® System 61BT	72-1004 71-9302
D.12	Appendix D.12 - Accident Analyses for Standardized NUHOMS® System 61BTH	72-1004 71-9302
E.12	Appendix E.12 - Accident Analyses for NAC-MPC	72-1025
F.12	Appendix F.12 - Accident Analyses for NAC-UMS	72-1015
G.12	Appendix G.12 - Accident Analyses for NAC-MAGNASTOR	72-1031

All Indicated Changes are for Consistency

3.1 Purposes of Installation

The purpose of the WCS CISF is to provide interim storage for pressurized water reactor (PWR) and boiling water reactor (BWR) SNF from commercial nuclear power plants throughout the United States and GTCC waste. The initial phase, Phase 1, is designed to store approximately 470 canisters containing SNF and GTCC waste. The total storage capacity for Phase 1 is limited to 5,000 metric tons of heavy metal (MTHM) for SNF and 510,000 pounds of GTCC waste.

The WCS CISF utilizes dry cask storage systems. These systems store canisters of SNF and GTCC waste inside a storage overpack which provides physical protection, heat removal, radiation shielding, criticality control, and confinement for the safe storage of SNF.

The dry cask storage systems used at the WCS CISF include the NUHOMS®-MP187 Storage System (SNM License 2510), the Standardized NUHOMS® 61BT Storage System and the Standardized NUHOMS® 61BTH Type 1 Storage System (NRC Certificate of Compliance 72-1004), the Standardized *Advanced* NUHOMS® Storage System (NRC Certificate of Compliance 72-1029), the NAC-MPC Storage System (NRC Certificate of Compliance 72-1025), the NAC-UMS Storage System (NRC Certificate of Compliance 72-1015), and the MAGNASTOR Storage System (NRC Certificate of Compliance 72-1031).

3.1.1 Materials to Be Stored

3.1.1.1 Spent Fuel and Other Radioactive Materials Associated with Fuel Assemblies

The WCS CISF provides interim storage for SNF and GTCC waste loaded in canisterized systems until retrieval of the canisters for transport to a repository or other site. The SNF and GTCC waste is stored in sealed, metallic canisters inside storage overpacks. The canisters contain multiple SNF assemblies and associated hardware or GTCC waste in a dry, inert environment. The Phase 1 CISF is designed to store approximately 470 casks with canisters containing SNF or GTCC waste. The total SNF storage capacity for the WCS CISF is 5,000 MTHM.

All of the types of canisterized SNF that would be stored at the WCS CISF during Phase 1 have previously been approved for storage in one of the six storage overpack systems. The physical, thermal and radiological characteristics for these SNF types are described in detail in the final safety analysis reports (FSAR) for cask storage systems identified in Section 2.1 of the Technical Specifications and listed in Table 1-1.

3.2.1.3 Not Used

3.2.1.4 Tornado Missiles

SSCs that are classified as ITS are designed for*, or administrative provisions are implemented to protect against impacts from,* tornado-generated missiles. The loaded storage overpacks are designed to remain stable and to maintain the confinement boundary when subjected to tornado-generated missiles. The Cask Handling Building (CHB) is designed to withstand tornado-generated wind loading and missiles without collapse so as to prevent reducing packaging effectiveness of casks contained within. Preventing penetration of tornado-generated missiles is not considered a CHB structural design requirement, as the casks themselves are designed to withstand these impacts. Tornado-generated missiles are not required to be considered in the design of the canister since the canister is protected by the storage overpack.

NUHOMS® equipment used during the canister transfer operations is explicitly evaluated for tornado generated missile impacts. However, NAC transfer casks are not explicitly evaluated for tornado generated missile impacts. Thus, administrative controls are implemented to prevent the opportunity for such a condition to exist. These administrative controls and requirements are detailed in the LCOs for each NAC system related to canister transfer operations.

Similarly, NAC transportation casks are not explicitly evaluated for tornado generated missile impacts. However, transportation casks are exposed to external environmental conditions during transportation and 10 CFR Part 71 requires the cask to be analyzed for conditions more severe than just a tornado generated missile condition. Examples include a 30m drop test and a 1 foot puncture drop test. All NAC transportation casks meet these requirements. Therefore, all NAC transportation casks are designed such that they can survive any tornado generated missile impacts at the WCS CISF.

Tornado missile load conditions are based on the design basis tornado addressed in Section 3.2.1.1. The evaluation cases required by NUREG-0800, Section 3.5.1.4 [3-3] include at least three objects as potential tornado missiles: a massive high kinetic energy missile which deforms on impact, a rigid missile to test penetration resistance, and a small rigid missile of a size sufficient to just pass through any openings in protective barriers. Tornado missile load cases are established in Table 1-2.

3.2.2 Water Level (Flood) Design

The WCS CISF is located in Andrews County, Texas which has a semi-arid climate with approximately 16 inches of rain per year. There are no lake systems or flowing or intermittent streams nearby.

There is a fire suppression system in the CHB that is installed to mitigate the consequences of a fire.

WCS CISF initiated explosions are not considered credible since no explosive materials are present. The effects of externally initiated explosions are bounded by the design basis tornado generated missile load analysis performed for the authorized storage systems.

3.3.7 Material Handling and Storage

This section of the principal design criteria establishes requirements that satisfy 10 CFR 72.128(a) and (b) [3-23], which identify general design criteria that requires SNF storage and handling systems be designed to ensure adequate safety under normal and accident conditions and that radioactive waste treatment facilities be provided.

3.3.7.1 Spent Fuel or High-Level Radioactive Waste Handling and Storage

To meet WCS CISF functional requirements to receive, transfer, store and retrieve canisterized SNF and GTCC waste, the following criteria are established for the WCS CISF design.

Storage and handling systems are designed to allow ready retrieval of the canisters for shipment off-site, and the cask/canister handling systems are designed in accordance with 10 CFR 72.128(a) [3-23] to ensure adequate safety under normal and accident conditions. The following criteria for cask systems are also satisfied.

- Cask systems are designed and certified to withstand a drop event from heights specified in the Technical Specifications [3-1] for each individual system. WCS CISF operation procedures and limitations ensure casks are within these heights.
- Cask systems designed to transfer canisters are designed to withstand the impact of the postulated tornado missiles *or administrative provisions are implemented to protect against impacts from tornado missiles* during transfer operations. For this event, "designed to withstand" is defined as no impact on ITS functions except the following: A partial loss of shielding is allowed to the extent evaluated.
- Cask systems utilizing vertical transfer must be qualified for a 6-inch drop of the storage overpack or transportation cask lid during transfer operations.

The CHB cranes and associated cask/canister lifting equipment are designed utilizing the standards identified in the Technical Specifications [3-1].

3.3.7.2 Radioactive Waste Treatment

Radioactive contamination is anticipated to be negligible because SNF and GTCC waste is packaged in sealed canisters. Small volumes of solid radioactive wastes are expected. Waste will be managed in accordance with Section 3.3.7.3.

All Indicated Changes are to address 72.122(b)

5.7 References

5-1 Proposed SNM-1050, WCS Consolidated Interim Storage Facility Technical Specifications, Amendment 0.

5-2 "Post Transport Package Evaluation," QP-10.02, Revision *2*.

5-3 WCS CISF Security Plan, Revision 0.

5-4 NUREG-0612, Control of Heavy Loads at Nuclear Power Plants, U.S. Nuclear Regulatory Commission, July 1980.

All Indicated Changes are for Consistency

Incorporation of the CTS into the Cask Handling Building utilizes an independent pad design, thicker than that of the CHB floor. In the typical installation detail (Figure 7-32), the rail system is shown integrated with an ISFSI pad design with a thickness of 3' and have ISFSI pad reinforcement. The pad will span an area of approximately 42' wide and up to 60' long, essentially the size of an ISFSI pad for a 2 x 4 cask array. This allows adequate spacing for the placement of 2 transportation systems and 2 storage systems for content transfer in the CTS. As can be seen in Figure 7-32, the rail embedment is integrated into the ISFSI pad rebar design and is located at the edges of the pad. The figure only shows a single rail system whereas two systems, mirror image, are required for the CTS gantry crane.

As the CTS pad is essentially a small ISFSI pad *for VCCs as described in Section 7.6.1*, the CTS pad *is bounded by the evaluations provided in Section 7.6.1 and is* ITS to the same degree as an ISFSI pad. Tip-over has been evaluated for both the transport casks (Section 7.6.6) and storage casks (Section 7.6.1.6) and would be applicable for those components during their period of placement on the CTS pad.

The following Codes and Standards are used in the analysis, fabrication and installation of the CTS rail installation and supporting pad design.

The objective of the CHB analysis and design for tornado missile impacts is to ensure that structural integrity and stability of the primary framing system is maintained. Therefore, only those members critical to lateral and/or vertical stability of the overall structure are required to survive under any potential tornado missile impact scenario, as demonstrated by sufficient code-based capacity to resist the combination of gravity and tornado wind, APC, and impact demands present in the design load combinations. Other members not required to survive tornado missile impact scenarios are identified as sacrificial, or not critical to structural stability. Two categories of sacrificial members are defined: 1) members that do not serve as critical elements of the overall structure primary lateral or vertical load paths and are not required for overall structural stability, such as beams not serving as collectors or struts; and 2) members that are part of the primary lateral or vertical load paths but have redundant counterparts that are assured to survive if the sacrificial member fails. This second category includes several types of horizontal struts, vertical braces, and the center 'zipper' column of each three-column set on the east-west column lines; in each of these cases the redundant framing arrangement provides secondary lateral and/or vertical load paths and stability framing in case of sacrificial member failure.

The design of sacrificial members and their connections does not require the members to remain attached to the structure after impact (i.e., the sacrificial members may themselves become airborne). This is permitted because the safety-related fuel bearing SSCs *for NUHOMS®* inside the building have been designed to resist the full spectrum of Regulatory Guide 1.76 tornado missiles representing the range of potential missiles on the plant site. The sacrificial members are considered rigid building debris components as defined in the missile criteria in Regulatory Guide 1.76 [7-35]. Chapter 12 of the appendices (A.12, B.12, etc.) demonstrate that each cask system component is designed and conservatively evaluated for the most severe tornado and missiles anywhere within the United States (Region I as defined in NRC Regulatory Guide 1.76 [7-35]), therefore, the impact of the sacrificial members on the cask systems is bounded. *Administrative Controls will be used to mitigate impacts of design-basis tornado loading for the transportation casks (during overhead crane operations) and NAC transfer casks. As described in Section 7.5.3.2.1, the transportation casks will not be moved into the building to begin the railcar unloading process unless current and forecasted weather for the approaching eight (8) hours indicate safe weather conditions. In addition, similar controls, as addressed in Section 3.2.1.4, will be applicable during the time that the canisters are in the NAC transfer casks. Finally, Section 3.2.1.4 describes how the NAC transportation casks are qualified for tornado generated missile impacts.*

All Indicated Changes are to address 72.122(b)

- ASCE/SEI 4-16, Seismic Analysis of Safety-Related Nuclear Structures. Applicable to seismic analysis procedures for the Cask Handling Building and its foundations.
- ASCE/SEI 7-16, Minimum Design Loads and Associated Criteria for Buildings and Other Structures. Applicable to development of normal operating wind loads, snow and rain loads, and overhead crane operating loads.
- ASCE/SEI 7-05, Minimum Design Loads for Buildings and Other Structures. Applicable to transforming tornado wind speed into pressures applicable to the CHB, in accordance with NUREG-0800 Section 3.3.2, Tornado Loads.
- ASME NOG-1-2015, Rules for Construction of Overhead and Gantry Cranes (Top Running Bridge, Multiple Girder). Applicable to analysis and design of the two 130-ton overhead cranes supported by the CHB.
- CMAA-70 2015, Specifications for Top Running Bridge and Gantry Type Multiple Girder Electric Overhead Traveling Cranes. Applicable to design of the CHB crane runway system.

7.5.3.2.1 Load Definitions

The CHB structure is designed to withstand snow and rain in accordance with the International Building Code. In addition, it is designed to resist failure of structural members under concurrent loading by design-basis tornado winds, atmospheric pressure change (APC), and tornado missiles.

Administrative Controls will be used to mitigate impacts of design-basis tornado loading. The transportation cask will not be moved into the building to begin the railcar unloading process unless current and forecasted weather for the approaching eight (8) hours indicate safe weather conditions. Eight hours is the estimated time to move any of the casks from the railcar to a stable configuration within the CHB in which the crane is no longer overhead or adjacent. For the NUHOMS® systems, eight hours bounds the approximate time (6.4 hours for MP187 casks, 4.3 hours for MP197HB casks) from entry of the cask railcar into the CHB, to the point where the cask has been placed on the transfer skid and the overhead crane can be relocated to the south end of the CHB. For the NAC systems, eight hours bounds the approximate time (5.5 hours for NAC-STC casks, 6.5 hours for NAC-UTC casks, and 8 hours for NAC-MAGNATRAN casks) from entry of the cask railcar into the CHB, to placement of the canister on the Canister Transfer Facility pad, at which point the overhead crane will no longer be overhead or adjacent to the cask on the railcar. Estimated time to perform cask receipt and transfer activities are provided as occupancy times in the occupational collective dose tables in each cask model's respective Appendix, refer to Tables A.9-2, B.9-2, C.9-2, D.9-2, E.9-1, F.9-1, and G.9-1.

Administrative controls will restrict the movement of the overhead crane such that it will remain in the south-most bay of the CHB once railcar unloading has been completed. Administrative controls will prohibit additional non-empty casks on railcars inside the CHB, and thus adjacent to the crane, until the previous cask has been removed from the CHB and the next unloading evolution can proceed, weather conditions permitting. Similarly, for railcar loading operations following retrieval of a loaded canister, the loading process will not be permitted to proceed unless current and forecasted weather for the approaching eight hours indicate safe weather conditions. These actions eliminate the potential for collapse of overhead cranes onto canisters during receipt, transfer, and retrieval operations (with storage operations occurring outside the CHB).

Also, administrative controls are used to demonstrate compliance with 72.122(b) when the canisters are being transferred in the NAC transfer casks. NAC canister transfer operations typically take around 6 hours to complete. This is from the time the canister is lifted off the bottom of the transportation cask cavity, moved over to the VCC and lowered until it is resting on the VCC pedestal. This is consistent with the times estimated in Tables E.9-1, F.9-1 and G.9-1 for the NAC systems. Removal of the last three transportation cask lid bolts and installation of at least six lid bolts in the loaded VCC adds an estimated additional two hours to the transfer operation. Therefore, removal of the last three bolts from the transportation cask and the ensuing transfer operations will not be permitted unless current and forecasted weather for the approaching eight hours indicate safe weather conditions. (See LCOs 3.2.1, 3.3.1, and 3.4.1 [7-78]) Thus, the total transfer time is typically 8 hours (i.e., 6 hours to complete the lifts and 2 hours to install the bolts for a total of 8 hours). Steps will be taken to improve on these times such as staging equipment in an efficient manner.

A safe condition and forecast is considered to be the absence of: Tornado and Severe Thunderstorm Watches, Tornado and Severe Thunderstorm Warnings, and predicted wind speeds that would qualify for a Severe Thunderstorm Watch (58 mph or greater). Weather forecasts will be accessed from the NOAA Weather Forecast Office prior to each railcar loading/unloading. The nearest NOAA Weather Forecast Office to the CISF is the Midland/Odessa Office. Administrative controls triggered by the presence of Tornado and Severe Thunderstorm Watches, Tornado and Severe Thunderstorm Warnings, and predicted wind speeds that would qualify for a Severe Thunderstorm Watch ensure avoidance of atmospheric conditions which are favorable for the development of severe thunderstorms capable of producing tornados within the following eight hours. *In addition, as documented in Section 2.3.3.3 of the SAR only two (2) F2 Class tornadoes have been recorded in Andrews County, TX from 1950 through 2015 according to data from the National Oceanic and Atmospheric Administration (NOAA) and only eight (8) F1 Class tornadoes. Therefore, the risk of an unexpected tornado within eight hours of the time that no severe weather is predicted is extremely remote.*

This section describes loads, loading combinations and analysis methods to be met for design of the WCS CISF reinforced concrete and structural steel structures.

All Indicated Changes are to address 72.122(b)

7.7 References

7-1 "Post Transport Package Evaluation," QP-10.02, Revision *2*.

7-2 US Nuclear Regulatory Commission NUREG-0554, "Single-Failure-Proof Cranes for Nuclear Power Plants," May 1979.

7-3 US Nuclear Regulatory Commission NUREG-0612, "Control of Heavy Loads at Nuclear Power Plants," July 1980.

7-4 ASME NOG-1-2010, "Rules for Construction of Overhead and Gantry Cranes (Top Running Bridge, Multiple Girder)," The American Society of Mechanical Engineers, 2010.

7-5 US Nuclear Regulatory Commission Regulatory Issue Summary 2005-25, Supplement 1, "Clarification of NRC Guidelines for Control of Heavy Loads," May 2007.

7-6 US Nuclear Regulatory Commission Regulatory Guide 1.29, "Seismic Design Classification," Revision 4, March 2007.

7-7 American Society of Mechanical Engineers Boiler and Pressure Vessel Code, Section IX, Qualification Standard for Welding and Brazing Procedures, Welders, Brazers, and Welding and Brazing Operators, latest Edition at time of PO issuance.

7-8 American Welding Society D1.1, Structural Welding Code – Steel, 1996.

7-9 ANSI N14.6-1993 American National Standard for Radioactive Materials – "Special Lifting Devices for Shipping Containers Weighing 10,000 Pounds (4500 kg) or More", 1993.

7-10 Crane Manufacturers Association of America (CMAA) Specification #70, 2004.

7-11 American Society of Mechanical Engineers NQA-1, "Quality Assurance Requirements for Nuclear Facility Applications," 1994 Edition.

7-12 NAC Equipment Specification Sheet, ESS-032, "Kuosheng ISFSI Gantry Cranev Lift Booms and Trolley Beam Side Shift Assemblies."

7-13 American Society of Mechanical Engineers B30.16-2007, "Overhead Hoists (Underhung)".

7-14 American Society of Mechanical Engineers NUM-1, "Rules for Construction of Cranes, Monorails, and Hoists (with Bridge or Trolley or Hoist of the Underhung Type)."

7-15 Deleted.

7-16 American Society of Mechanical Engineers B30.10-2009, "Hooks."

7-17 Calculation 630075-2004, rev 13, Gantry Crane Structural Evaluation, NAC International.

7-18 Calculation 630075-2006, rev 4, Adapter Plate and Clevis Plate Structural Evaluation, NAC International.

7-19 Calculation 630075-2015, rev 7, Structural Evaluation of Miscellaneous Gantry Crane Components, NAC International.

All Indicated Changes are for Consistency

7-78 *Proposed SNM-1050, WCS Consolidated Interim Storage Facility Technical Specifications, Amendment 0.*

All Indicated Changes are to address 72.122(b)

Table 7-24
Description of Confinement Boundaries

System	Appendix Location
NUHOMS® MP187 Cask System	Section A.11.1
Standardized *Advanced* NUHOMS® System	Section B.11.1
Standardized NUHOMS®-61 BT System	Section C.11.1
Standardized NUHOMS®-61 BTH Type 1 System	Section D.11.1
Yankee-MPC	Section E.11.1.1
CY-MPC	Section E.11.1.1
MPC-LACBWR	Section E.11.2.1
NAC-UMS	Section F.11.1.1
NAC-MAGNASTOR	Section G.11.1.1

All Indicated Changes are for Consistency

Table 7-43
Maximum *Demand/Capacity* Ratios (DCRs)

Element	Load Combination				
	Gravity	Seismic	Tornado Wind Pressure[1]	Tornado Missile Impact with Tornado Wind Pressure[2]	Governing DCR[6]
Main Column	0.17	0.27	0.21	0.65	0.65
Zipper Column[3]	0.08	0.10	0.15	0.16	0.16
Crane Column	0.30	0.28	0.11	0.65	0.65
Wind Column	0.12	0.12	0.13	0.70	0.70
Sacrificial Strut[3]	0.23	0.37	0.15	0.66	0.66
Non-Sacrificial Strut[4]	0.23	0.37	0.15	0.70	0.70
Crane Girder[5]	0.19	0.29	0.05	0.11	0.29
Roof truss bottom chord	0.12	0.16	0.38	0.62	0.62
Roof truss top chord	0.15	0.22	0.33	0.65	0.65
Roof truss web member	0.62	0.57	0.61	0.68	0.68
Sacrificial N-S Vertical Bracing[3]	0.21	0.12	0.12	0.61	0.61
Sacrificial E-W Vertical Bracing[3]	0.32	0.34	0.28	0.83	0.83
Sacrificial Crane Vertical Bracing[3]	0.32	0.25	0.12	0.19	0.32

1. The Tornado Wind Pressure DCRs do not reflect tornado missile impact; i.e., automobile. Columns are generally sized for missile impact.
2. Not all possible missile impact locations have been considered in this preliminary analysis. DCRs reflected are based on representative sampling of primary member and framing system impact locations. During detailed design, the governing DCR may increase (see Note 6).
3. Sacrificial members hit directly or in close proximity to a tornado missile are allowed to fail. These member DCRs are reflective of an indirect missile strike.
4. Non-Sacrificial members are designed to withstand a missile impact. These DCRs are indicative of a member that is directly impacted by a tornado missile. Unless noted otherwise, all members are non-sacrificial.
5. The DCRs for the crane girder do not consider all crane position loading scenarios and fatigue to be addressed in detailed design. These considerations may result in an increase in DCR (see Note 6).
6. During detailed design, the maximum member DCR shall not exceed 0.90.

All Indicated Changes are for Consistency

The evaluation using the storage design basis heat load for the NAC-MAGNASTOR loaded with PWR fuel demonstrates that at sea level the margin between the PCT and the long-term allowable is approximately 34°F. Therefore, the effect of elevation (i.e., 23.5°F increase) is within the margin. It is important to note that this margin is based on a significantly higher PWR storage heat load of 35.5 kW than would be allowed at the WCS CISF. In order for a NAC-MAGNASTOR canister to be shipped to the WCS CISF it must be below the maximum permissible heat load of the MAGNATRAN transportation cask, which is 23kW for PWR fuel. This is a design basis storage canister heat load reduction of approximately 35% prior to transportation. Applying this reduction to the design basis storage PCT would increase the margin to approximately 262°F (i.e., [752 - (718°F X 0.65)] – 23.5°F = 262°F). Therefore, the effect of elevation for a NAC-MAGNASTOR PWR canister that was previously in dry storage and subsequently shipped and placed back into storage at the WCS CISF is not significant.

The Effect of Low Speed Wind

1. Standardized NUHOMS® Systems

   According to NUREG-2174, wind does not have any significant effect on the thermal performance of Standardized NUHOMS® Systems. Therefore, no additional analyses are needed for low wind speed.

2. *Standardized* Advanced NUHOMS® Systems

   According to NUREG-2174, a wind evaluation should be included for *Standardized* Advanced NUHOMS® Systems (AHSM) when there is not sufficient margin.

   Standardized Advanced NUHOMS® System is considered for storage in Appendix B.8. The maximum fuel cladding temperature for thermal evaluations presented in Appendix B.8 has a significant margin to the fuel cladding temperature limit.

   The maximum fuel cladding temperature for normal storage operations is 618°F (Table 4.4-7 of CoC 1029 UFSAR). As noted in Section B.8.5.2, thermal evaluation for AHSM was based on a heat load of 24 kW compared to the maximum allowed heat load of 14.0 kW, providing sufficient margin. Therefore, no additional analyses are needed for low wind speed.

All Indicated Changes are for Consistency

8.5 References

8-1 Proposed SNM-1050, WCS Consolidated Interim Storage Facility Technical Specifications, Amendment 0.

8-2 "Post Transport Package Evaluation," QP-10.02, Revision *2*.

8-3 Letter from Robert Grubb (TN) to NRC Document Control Desk, "Revision 1 to Transnuclear, Inc. (TN) Application for Amendment 10 to the Standardized NUHOMS® System (Docket No. 72-1004; TAC NO. L24052)," November 7, 2007 (E-25506) ML073180235.

All Indicated Changes are for Consistency

11.6 References

11-1 Proposed SNM-1050, WCS Consolidated Interim Storage Facility Technical Specifications, Amendment 0.

11-2 "Post Transport Package Evaluation," QP-10.02, Revision *2*.

All Indicated Changes are for Consistency

B.3.2 NAC-MPC SYSTEM Integrity

B.3.2.1 CANISTER Maximum Time in the TRANSFER CASK

BASES

BACKGROUND	During TRANSFER OPERATIONS or prior to TRANSPORT OPERATIONS, a loaded CANISTER is transferred from one VCC to another VCC (or a TRANSPORTATION CASK) using the TRANSFER CASK. The TRANSFER CASK is placed on the VCC (or a TRANSPORTATION CASK), the bottom doors are opened, the loaded CANISTER is lifted into the TRANSFER CASK cavity, the bottom shield doors are closed and the CANISTER is lowered until it rests on the bottom doors. Subsequently, the loaded TRANSFER CASK is placed on another VCC (or TRANSPORTATION CASK) and the procedure is reversed, lowering the loaded CANISTER into another VCC (or TRANSPORTATION CASK). The LCO limits the total time a CANISTER can be maintained in the TRANSFER CASK to 25 days (600 hrs). *There is also a time limitation for completing the transfer operation due to adverse weather conditions. The transfer cask is not explicitly analyzed for tornado generated missile impacts. Since the CHB is not a hardened structure and the transfer cask is not analyzed for missile impacts, administrative and operational constraints are placed on completing the transfer operation. After contacting the NWS, the 8 hour transfer time window will start when the last three transportation cask lid bolts are removed and ends when at least six lid bolts are installed on a loaded VCC or the canister is placed back in the transportation cask with the lid installed using at least three bolts. Installation of these lids and bolts ensure the canister is in a structure suitable for adverse weather conditions.*
APPLICABLE SAFETY ANALYSIS	Limiting the total time that a loaded CANISTER backfilled with helium may be in the TRANSFER CASK, prior to placement in a VCC, or TRANSPORTATION CASK, precludes the inappropriate use of the TRANSFER CASK as a storage component. The thermal analyses in the NAC-MPC Final Safety Analysis Report show that the short-term temperature limits for the spent fuel cladding are not exceeded for an unlimited period of time (steady state analysis). The duration of 25 days (600 hrs) is defined based on a test time of 30 days for abnormal regimes as described in PNL-4835.

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All Indicated Changes are to address 72.122(b)

BASES

LCO	Limiting the length of time that the loaded CANISTER backfilled with helium is allowed to remain in the TRANSFER CASK ensures that the TRANSFER CASK is not inappropriately used as a storage component.
APPLICABILITY	The elapsed time restrictions on a loaded CANISTER in the TRANSFER CASK apply during TRANSFER OPERATIONS and prior to TRANSPORT OPERATIONS.
ACTIONS	A note has been added to the ACTIONS, which states that, for this LCO, separate Condition entry is allowed for each NAC-MPC system. This is acceptable, since the Required Actions for each Condition provide appropriate compensatory measures for each NAC-MPC system not meeting the LCO. Subsequent NAC-MPC systems that do not meet the LCO are governed by subsequent Condition entry and application of associated Required Actions. A.1 Complete CANISTER TRANSPORTATION CASK. B.1 Return CANISTER to TRANSPORTATION CASK or VCC. *A second note has been added defining the 8 hour transfer time window after verifying with the NWS that SAFE WEATHER CONDITIONS exist for at least the next 8 hours. This is acceptable because the total transfer time for this situation is typically 8 hours (i.e., 6 hours to complete the lifts and 2 hours to install lid bolts for a total of 8 hours). Thus, an LCO that allows an 8 hour window to complete these operations is acceptable.*
SURVEILLANCE REQUIREMENTS .	SR 3.2.1.1 Verify CANISTER transfer complete.
REFERENCES	NAC-MPC FSAR Sections 4.4, 4.5, 4.A.3, 8.1, 8.2, 8.3, 8.A.1, 8.A.2 and 8.A.3.

All Indicated Changes are to address 72.122(b)

B.3.3 NAC-UMS SYSTEM Integrity

B.3.3.1 CANISTER Maximum Time in the TRANSFER CASK

BASES

BACKGROUND

The cumulative time a loaded, helium backfilled CANISTER may remain in the TRANSFER CASK is limited to 600 hours. This limit ensures that the test duration of 30 days (720 hours) considered in PNL-4835 for zirconium alloy clad fuel for storage in air is not exceeded and ensures that the TRANSFER CASK is used as intended. The time limit is established to preclude long-term storage of a loaded CANISTER in the TRANSFER CASK. For heat loads less than or equal to 20kW (PWR) forced air cooling is not required. The maximum heat load allowed by NAC-UMS TRANSPORTATION CASK for the shipment of Maine Yankee fuel is 19.92 kW.

There is also a time limitation for completing the transfer operation due to adverse weather conditions. The transfer cask is not explicitly analyzed for tornado generated missile impacts. Since the CHB is not a hardened structure and the transfer cask is not analyzed for missile impacts, administrative and operational constraints are placed on completing the transfer operation. After contacting the NWS, the 8 hour transfer time window will start when the last three transportation cask lid bolts are removed and ends when at least six lid bolts are installed on a loaded VCC or the canister is placed back in the transportation cask with the lid installed using at least three bolts. Installation of these lids and bolts ensure the canister is in a structure suitable for adverse weather conditions.

APPLICABLE SAFETY ANALYSIS

Analyses reported in the NAC-UMS Safety Analysis Report for heat loads of 20 kW or less (PWR), and with the CANISTER backfilled with helium, the analysis shows that the fuel cladding and CANISTER components reach a steady-state temperature below the short-term allowable temperatures. Therefore, the time in the TRANSFER CASK is limited to 600 hours.

This limit ensures that the test duration of 30 days (720 hours) considered in PNL 4835 for zirconium alloy clad fuel for storage in air is not exceeded and ensures that the TRANSFER CASK is used as intended. Since the 600 hours is significantly less than the 720 hours considered in PNL-4835, operation in the TRANSFER CASK to this period is acceptable.

All Indicated Changes are to address 72.122(b)

BASES

LCO

For PWR heat loads less than or equal to 20 kW, the thermal analysis shows that the presence of helium in the CANISTER is sufficient to maintain the fuel cladding and CANISTER component temperatures below the short term temperature limits. Therefore, forced air cooling is not required for these heat load conditions. Therefore, the CANISTER may remain in the TRANSFER CASK for up to 600 hours, where the time limit is based on the test duration of 30 days (720 hours) considered in PNL 4835 for zirconium alloy clad fuel for storage in air rather than on temperature limits.

APPLICABILITY

During TRANSFER OPERATIONS the TRANSFER CASK active cooling system must be in operation or the time limits specified must be adhered to. This LCO is applicable once a CANISTER is lifted off the VCC pedestal or the TRANSPORTATION CASK is no longer in the horizontal orientation.

ACTIONS

A note has been added to the ACTIONS, which states that, for this LCO, separate Condition entry is allowed for each NAC-UMS® system. This is acceptable, since the Required Actions for each Condition provide appropriate compensatory measures for each NAC-UMS® system not meeting the LCO. Subsequent NAC-UMS® systems that do not meet the LCO are governed by subsequent Condition entry and application of associated Required Actions.

A note has been added to Condition A that reminds users that all time spent in Condition A is included in the 600-hour cumulative limit.

If the LCO 3.3.1. 600-hour cumulative time limit is exceeded:

A.1
The CANISTER shall be placed in a VCC.

<u>OR</u>

A.2
The CANISTER shall be placed in a TRANSPORTATION CASK.

A second note has been added defining the 8 hour transfer time window after verifying with the NWS that SAFE WEATHER CONDITIONS exist for at least the next 8 hours. This is acceptable because the total transfer time for this situation is typically 8 hours (i.e., 6 hours to complete the lifts and 2 hours to install lid bolts for a total of 8 hours). Thus, an LCO that allows an 8 hour window to complete these operations is acceptable.

All Indicated Changes are to address 72.122(b)

B.3.4 MAGNASTOR SYSTEM Integrity

B.3.4.1 CANISTER Maximum Time in the TRANSFER CASK

BASES

BACKGROUND	When a MAGNASTOR CANISTER is lifted off a VCC pedestal or when the MAGNATRAN TRANSPORTATION CASK is no longer in the horizontal orientation, there are time limits with completing the transfer from a TRANSPORTATION CASK to a VCC and vice versa without the TRANSFER CASK active cooling system in operation. *There is also a time limitation for completing the transfer operation due to adverse weather conditions. The transfer cask is not explicitly analyzed for tornado generated missile impacts. Since the CHB is not a hardened structure and the transfer cask is not analyzed for missile impacts, administrative and operational constraints are placed on completing the transfer operation. After contacting the NWS, the 8 hour transfer time window will start when the last three transportation cask lid bolts are removed and ends when at least six lid bolts are installed on a loaded VCC or the canister is placed back in the transportation cask with the lid installed using at least three bolts. Installation of these lids and bolts ensure the canister is in a structure suitable for adverse weather conditions.*
APPLICABLE SAFETY ANALYSIS	To protect the fuel cladding from exceeding allowable temperature limits, the TRANSFER CASK active cooling system must be running or the transfer from a TRANSPORTATION CASK to a VCC and vice versa must be completed within a maximum timeframe.

All Indicated Changes are to address 72.122(b)

BASES

ACTIONS

A note has been added to the ACTIONS, which states that, for this LCO, separate Condition entry is allowed for each CANISTER. This is acceptable as the Required Actions for each Condition provide appropriate compensatory measures for each CANISTER not meeting the LCO. Subsequent CANISTERS that do not meet the LCO are governed by subsequent Condition entry and application of associated Required Actions.

A.1
If the TRANSFER OPERATIONS is not going to be completed in time, the CANISTER must be returned to the TRANSFER CASK immediately.

AND

A.2
The TRANSFER CASK active cooling system must be operational immediately.

AND

A.3
The TRANSFER CASK active cooling system must be operational for at least 24 hours before attempting a subsequent transfer attempt.

A second note has been added defining the 8 hour transfer time window after verifying with the NWS that SAFE WEATHER CONDITIONS exist for at least the next 8 hours. This is acceptable because the total transfer time for this situation is typically 8 hours (i.e., 6 hours to complete the lifts and 2 hours to install lid bolts for a total of 8 hours). Thus, an LCO that allows an 8 hour window to complete these operations is acceptable.

A.5.3 References

A.5-1 Certificate of Compliance for Radioactive Material Packages, No. 9255, current Revision , including the TN drawings incorporated by Condition 5.(a)(3) of the CoC and SAR Chapters 7 and 8 incorporated by Condition 7 of the CoC.

A.5-2 Proposed SNM-1050, WCS Consolidated Interim Storage Facility Technical Specifications, Amendment 0.

A.5-3 "Post Transport Package Evaluation," QP-10.02, Revision *2*.

All Indicated Changes are for Consistency

B.1. INTRODUCTION AND GENERAL DESCRIPTION OF INSTALLATION

No change or additional information required for the *Standardized* Advanced NUHOMS® System containing the NUHOMS® 24PT1-DSCs for Chapter 1.

All Indicated Changes are for Consistency

B.2. SITE CHARACTERISTICS

No change or additional information required for the *Standardized* Advanced NUHOMS® System containing the NUHOMS® 24PT1-DSCs for Chapter 2.

B.3. PRINCIPAL DESIGN CRITERIA

The Standardized Advanced NUHOMS® System principal design criteria is documented in Chapter 2 of the "*Standardized* Advanced NUHOMS® Horizontal Modular Storage System Safety Analysis Report" [B.3-1]. Table B.3-1 provides a comparison of the Standardized Advanced NUHOMS® System principal design criteria and the WCS Consolidated Interim Storage Facility (WCS CISF) design criteria provided in Table 1-2 which demonstrates that the Standardized Advanced NUHOMS® System bounds the WCS CISF criteria.

All Indicated Changes are for Consistency

B.3.1 SSCs Important to Safety

The classifications of the Standardized Advanced NUHOMS® System systems, structures and components, are discussed in Section 2.5 of the of the "*Standardized* Advanced NUHOMS® Horizontal Modular Storage System Safety Analysis Report" [B.3-1] for the canister and AHSM and Section 3.4 of the "Rancho Seco Independent Spent Fuel Storage Installation Safety Analysis Report" [B.3-2] for the MP187 cask in the transfer configuration. These classifications are summarized in Table B.3-2 for convenience.

B.3.1.1 24PT1 DSC

The 24PT1-DSC provides fuel assembly support required to maintain the fuel geometry for criticality control. Accidental criticality inside a 24PT1-DSC could lead to off-site doses comparable with the limits in 10 CFR Part 100, which must be prevented. The 24PT1-DSC also provides the confinement boundary for radioactive materials. The DSCs are designed to maintain structural integrity under all accident conditions identified in Chapter 12 without losing their function to provide confinement of the spent fuel assemblies. The DSCs are important-to-safety (ITS).

B.3.1.2 Horizontal Storage Module

For the Standardized Advanced NUHOMS® System, the horizontal storage modules (HSM) used is the advance horizontal storage module, herein referred to as AHSM. The AHSM is considered ITS since it provides physical protection and shielding for the spent fuel container (24PT1-DSC) during storage. The reinforced concrete AHSM is designed in accordance with ACI 349-97 [B.3-5] and built to ACI-318 [B.3-6]. The level of testing, inspection, and documentation provided during construction and maintenance is in accordance with the quality assurance requirements as defined in 10 CFR 72, Subpart G. Thermal instrumentation for monitoring AHSM concrete temperatures is considered "not-important-to-safety" (NITS).

B.3.1.3 NUHOMS® Basemat and Approach Slab

The basemat and approach slabs for the AHSMs are considered NITS and are designed, constructed, maintained, and tested to ACI-318 [B.3-5] as commercial-grade items.

All Indicated Changes are for Consistency

B.3.2 Spent Fuel to Be Stored

The authorized contents for the 24PT1-DSCs are described in Certificate of Compliance 72-1029 [B.3-7] and the "*Standardized* Advanced NUHOMS® Horizontal Modular Storage System Safety Analysis Report" [B.3-1].

Certificate of Compliance 72-1029 Technical Specifications Section 2.1 [B.3-7] provides a description of the fuels stored in the 24PT1 DSCs as referenced in Section 2.1 "Spent Fuel to be Stored" of the "*Standardized* Advanced NUHOMS® Horizontal Modular Storage System Safety Analysis Report" [B.3-1].

B.3.4 Safety Protection Systems

The safety protection systems of the Standardized Advanced NUHOMS® Horizontal Modular Storage System are discussed in Section 2.3 of the "*Standardized* Advanced NUHOMS® Horizontal Modular Storage System Safety Analysis Report" [B.3-1].

B.3.4.1 General

The Standardized Advanced NUHOMS® Horizontal Modular Storage System is designed for safe confinement during dry storage of SFAs. The components, structures, and equipment that are designed to assure that this safety objective is met are summarized in Table B.3-2. The key elements of the Standardized Advanced NUHOMS® Horizontal Modular Storage System and its operation at the WCS CISF that require special design consideration are:

1. Minimizing the contamination of the DSC exterior.
2. The double closure seal welds on the DSC shell to form a pressure retaining confinement boundary and to maintain a helium atmosphere.
3. Minimizing personnel radiation exposure during DSC transfer operations.
4. Design of the cask and DSC for postulated accidents.
5. Design of the AHSM passive ventilation system for effective decay heat removal to ensure the integrity of the fuel cladding.
6. Design of the DSC basket assembly to ensure subcriticality.

B.3.4.2 Structural

The principal design criteria for the 24PT1 DSCs are presented in Section 2.3.2 of the "*Standardized* Advanced NUHOMS® Horizontal Modular Storage System Safety Analysis Report" [B.3-1]. The DSCs are designed to store intact, damaged and failed PWR FAs with or without Control Components. The fuel cladding integrity is assured by limiting fuel cladding temperature and maintaining a nonoxidizing environment in the DSC cavity.

The principal design criteria for the MP187 cask when used as a transfer cask are presented in Section 3.2.5.3 of the "Rancho Seco Independent Spent Fuel Storage Installation Safety Analysis Report" [B.3-2]. In this mode, the MP187 cask is designed for the on-site transfer of a loaded DSC from the Cask Handling Building to the AHSM.

All Indicated Changes are for Consistency

B.3.4.3 Thermal

The thermal performance requirements for the Standardized Advanced NUHOMS® Horizontal Modular Storage System are described in Section 2.3.2 of the "*Standardized* Advanced NUHOMS® Horizontal Modular Storage System Safety Analysis Report" [B.3-1]. The AHSM relies on natural convection through the air space in the AHSM to cool the DSC. This passive convective ventilation system is driven by the pressure difference due to the stack effect (ΔP_s) provided by the height difference between the bottom of the DSC and the AHSM air outlet. This pressure difference is greater than the flow pressure drop (ΔP_f) at the design air inlet and outlet temperatures.

B.3.4.4 Shielding/Confinement/Radiation Protection

The shielding performance and radiation protection requirements for the Standardized Advanced NUHOMS® Horizontal Modular Storage System are described in Sections 2.3.2.5 and 2.3.5 of the "*Standardized* Advanced NUHOMS® Horizontal Modular Storage System Safety Analysis Report" [B.3-1]. The confinement performance requirements for the Standardized NUHOMS® Horizontal Modular Storage System are described in Section 2.3.2 of the "*Standardized* Advanced NUHOMS® Horizontal Modular Storage System Safety Analysis Report" [B.3-1] for storage conditions. In addition, a bounding evaluation in WCS CISF SAR Section A.7.7 (also referenced in Section B.7.9) is performed to demonstrate that the confinement boundary for the 24PT1-DSC does not exceed ASME B&PV Subsection NB Article NB-3200 (Level A allowables) during normal conditions of transport to provide reasonable assurance that the confinement boundary is not adversely impacted by transport to the WCS CISF.

The AHSM provides the bulk of the radiation shielding for the DSCs. The AHSM design is arranged in a back-to-back arrangement. Thick concrete supplemental shield walls are used at either end of an AHSM array to minimize radiation dose rates both on-site and off-site. The AHSMs provide sufficient biological shielding to protect workers and the public.

The MP187 cask is designed to provide sufficient shielding to ensure dose rates are ALARA during transfer operations and off-normal and accident conditions.

There are no radioactive releases of effluents during normal and off-normal storage operations. In addition, there are no credible accidents that cause significant releases of radioactive effluents from the DSC. Therefore, there are no off-gas or monitoring systems required for the system at the WCS CISF.

B.3.4.5 Criticality

The criticality performance requirements for the Standardized Advanced NUHOMS® Horizontal Modular Storage System are described in Section 2.3.4 of the "*Standardized* Advanced NUHOMS® Horizontal Modular Storage System Safety Analysis Report" [B.3-1].

All Indicated Changes are for Consistency

For the DSCs, a combination of fixed poison in the basket and geometry are relied on to maintain criticality control. The structural analysis shows that there is no deformation of the basket under accident conditions that would increase reactivity.

B.3.4.6 Material Selection

Materials are selected based on their corrosion resistance, susceptibility to stress corrosion cracking, embrittlement properties, and the environment in which they operate during normal, off normal and accident conditions. The confinement boundary for the DSC materials meet the requirements of ASME Boiler and Pressure Vessel Code, Section III, Article NB-2000 and the specification requirements of Section II, Part D [B.3-8] with the listing of ASME Code Alternatives for the DSCs provided in Table 3.1-14 of the "*Standardized* Advanced NUHOMS® Horizontal Modular Storage System Safety Analysis Report" [B.3-1]. The DSC and cask materials are resistant to corrosion and are not susceptible to other galvanic reactions. Studies under severe marine environments have demonstrated that the shell materials used in the DSC shells are expected to demonstrate minimal corrosion during an 80-year exposure. The DSC internals are enveloped in a dry, helium-inerted environment and are designed to withstand the loads from all normal, off-normal and accident conditions. The AHSM is a reinforced concrete component with an internal DSC support structure that is fabricated to ACI and AISC Code requirements. Both have durability well beyond a design life of 80 years.

B.3.4.7 Operating Procedures

The sequence of operations are outlined for the Standardized Advanced NUHOMS® System in Chapter 5 and B.5 for receipt and transfer of the DSCs to the storage pad, insertion into the AHSM, monitoring operations, and retrieval and shipping. Throughout Chapter 5, CAUTION statements are provided at the steps where special notice is needed to maintain ALARA, protect the contents of the DSC, or protect the public and/or ITS components of the Standardized Advanced NUHOMS® System.

All Indicated Changes are for Consistency

Table B.3-1
Summary of WCS CISF Principal Design Criteria
(5 pages)

Design Parameter	**WCS CISF Design Criteria**	**Condition**	**Standardized Advanced NUHOMS® System Design Criteria**
Type of fuel	Commercial, light water reactor spent fuel	Normal (Bounded)	*Standardized* Advanced NUHOMS® FSAR Section 2.1
Storage Systems	Transportable canisters and storage overpacks docketed by the NRC	Normal (Bounded)	71-9255 72-1029
Fuel Characteristics	Criteria as specified in previously approved licenses for included systems	Normal (Bounded)	*Standardized* Advanced NUHOMS® FSAR Section 2.1
Tornado (Wind Load) (AHSM)	Max translational speed: 40 mph Max rotational speed: 160 mph Max tornado wind speed: 200 mph Radius of max rotational speed: 150 ft Tornado pressure drop: 0.9 psi Rate of pressure drop: 0.4 psi/sec	Accident (Bounded)	*Standardized* Advanced NUHOMS® FSAR Section 2.2.1 and Table 3.6-10 Max translational speed: 70 mph Max rotational speed: 290 mph Max tornado wind speed: 360 mph Radius of max rotational speed: 150 ft Tornado pressure drop: 3.0 psi Rate of pressure drop: 2.0 psi/sec
Tornado (Wind Load) (MP187 Cask)	Max translational speed: 40 mph Max rotational speed: 160 mph Max tornado wind speed: 200 mph Radius of max rotational speed: 150 ft Tornado pressure drop: 0.9 psi Rate of pressure drop: 0.4 psi/sec	Accident (Bounded)	Rancho Seco FSAR Section 3.2.1 of Volume 1 Max translational speed: NA Max rotational speed: NA Max tornado wind speed: 360 mph Radius of max rotational speed: NA Tornado pressure drop: NA Rate of pressure drop: NA

All Indicated Changes are for Consistency

Table B.3-1
Summary of WCS CISF Principal Design Criteria
(5 pages)

Design Parameter	WCS CISF Design Criteria	Condition	Standardized Advanced NUHOMS® System Design Criteria
Tornado (Missile)	Automobile 4000 lb, 112 ft/s Schedule 40 Pipe 287 lb, 112 ft/s Solid Steel Sphere 0.147 lb, 23 ft/s	Accident (Bounded)	*Standardized* Advanced NUHOMS® FSAR Section 2.2.1 Automobile 4000 lb, 195 ft/s 8" diameter artillery shell 276 lb, 185 ft/s Solid Steel Sphere NA 12" OD Steel Pipe 1500 lb, 205 fps Wood pole 1500 lb, 294 ft/s
Floods	The WCS CISF is not in a floodplain and is above the Probable Maximum Flood elevation and will remain dry in the event of a flood.	Accident (Bounded)	*Standardized* Advanced NUHOMS® FSAR Section 2.2.2 and Table 3.6-10 Flood height 50 ft Water velocity 15 ft/s
Seismic (Ground Motion)	Site-specific ground-surface uniform hazard response spectra (UHRS) with 1E-4 annual frequency of exceedance (AFE) having peak ground acceleration (PGA) of 0.250 g horizontal and 0.175 g vertical. (Table 1-5 and Figure 1-5)	Accident (Bounded)	*Standardized* Advanced NUHOMS® FSAR Section 2.2.3 Reg Guide 1.60 Response Spectra anchored at 1.5 g horizontal and 1.0 g vertical peak accelerations
Vent Blockage	For NUHOMS® Systems: Inlet and outlet vents blocked 40 hrs	Accident (Same)	*Standardized* Advanced NUHOMS® FSAR Section 4.6.2 and Table 3.6-10 Inlet and outlet vents blocked 40 hrs
Fire/Explosion	For NUHOMS® Systems: Equivalent fire 300 gallons of diesel fuel	Accident (Same)	*Standardized* Advanced NUHOMS® FSAR Section 4.6.4 Equivalent fire 300 gallons of diesel fuel
Cask Drop	For NUHOMS® Systems: Transfer Cask Horizontal side drop or slap down 80 inches(3)	Accident (Same)	Section B.7.3 (New Evaluation) Transfer Cask Horizontal side drop or slap down 80 inches(3)

All Indicated Changes are for Consistency

Table B.3-1
Summary of WCS CISF Principal Design Criteria
(5 pages)

Design Parameter	WCS CISF Design Criteria	Condition	Standardized Advanced NUHOMS® System Design Criteria
Transfer Load	For NUHOMS® Systems only: Normal insertion load 60 kips Normal extraction load 60 kips	Normal (Same)	Section B.7.3 (New Evaluation) and *Standardized* Advanced NUHOMS® FSAR Section 3.6.2.2.5 and Table 3.6-10 Normal insertion load 60 kips Normal extraction load 60 kips
Transfer Load	For NUHOMS® Systems only: Maximum insertion load 80 kips Maximum extraction load 80 kips	Off-Normal/ Accident (Same)	Section B.7.3 (New Evaluation) and *Standardized* Advanced NUHOMS® FSAR Section 3.6.2.2.7 Maximum insertion load 80 kips Maximum extraction load 80 kips
Ambient Temperatures	Normal temperature 44.1 – 81.5°F	Normal (Bounded)	*Standardized* Advanced NUHOMS® FSAR Table 4.1-1 Normal temperature 0 - 104°F(1)
Off-Normal Temperature	Minimum temperature 30.1°F Maximum temperature 113°F	Off-Normal (Bounded)	*Standardized* Advanced NUHOMS® FSAR Table 4.1-1 Minimum temperature -40.0°F Maximum temperature 117°F(2)
Extreme Temperature	Maximum temperature 113°F	Accident (Bounded)	*Standardized* Advanced NUHOMS® FSAR Table 4.1-1 Maximum temperature 120°F
Solar Load (Insolation)	Horizontal flat surface insolation 2949.4 BTU/day-ft² Curved surface solar insolation 1474.7 BTU/day-ft²	Normal (Same)	*Standardized* Advanced NUHOMS® FSAR Section 4.4.2.2 Horizontal flat surface insolation 2952 BTU/day-ft² Curved surface solar insolation Not Specified

All Indicated Changes are for Consistency

Table B.3-1
Summary of WCS CISF Principal Design Criteria
(5 pages)

Design Parameter	WCS CISF Design Criteria	Condition	Standardized Advanced NUHOMS® System Design Criteria
Snow and Ice	Snow Load 10 psf	Normal (Bounded)	*Standardized* Advanced NUHOMS® FSAR Section 2.2.4 Snow Load 110 psf
Dead Weight	Per design basis for systems listed in Table 1-1	Normal (Same)	*Standardized* Advanced NUHOMS® FSAR Sections 3.1.2.1.3.1, 3.6.1.1.3, and 3.6.2.2.1 and Table 3.6-10
Internal and External Pressure Loads	Per design basis for systems listed in Table 1-1	Normal (Same)	*Standardized* Advanced NUHOMS® FSAR Section 3.1.2.1.3.2
Design Basis Thermal Loads	Per design basis for systems listed in Table 1-1	Normal (Same)	*Standardized* Advanced NUHOMS® FSAR Section 3.1.2.1.3.3
Operating Loads	Per design basis for systems listed in Table 1-1	Normal (Same)	*Standardized* Advanced NUHOMS® FSAR Section 3.1.2.2.2 and Table 3.6-10
Live Loads	Per design basis for systems listed in Table 1-1	Normal (Same)	*Standardized* Advanced NUHOMS® FSAR Table 3.6-10 Design Load (including snow and ice) 200psf
Radiological Protection	Public wholebody ≤ 5 Rem Public deep dose plus individual organ or tissue ≤ 50 Rem Public shallow dose to skin or extremities ≤ 50 Rem Public lens of eye ≤ 15 Rem	Accident (Same)	Chapter 9 demonstrates these limits are met Public wholebody ≤ 5 Rem Public deep dose plus individual organ or tissue ≤ 50 Rem Public shallow dose to skin or extremities ≤ 50 Rem Public lens of eye ≤ 15 Rem

All Indicated Changes are for Consistency

Table B.3-1
Summary of WCS CISF Principal Design Criteria
(5 pages)

Design Parameter	WCS CISF Design Criteria	Condition	Standardized Advanced NUHOMS® System Design Criteria
Radiological Protection	Public wholebody $\leq$ 25 mrem/yr(4) Public thyroid $\leq$ 75 mrem/yr(4) Public critical organ $\leq$ 25 mrem/yr(4)	Normal (Same)	Chapter 9 demonstrates these limits are met Public wholebody $\leq$ 25 mrem/yr(4) Public thyroid $\leq$ 75 mrem/yr(4) Public critical organ $\leq$ 25 mrem/yr(4)
Confinement	Per design basis for systems listed in Table 1-1	N/A	*Standardized* Advanced NUHOMS® FSAR Section 7 [B.3-1] (leaktight)
Nuclear Criticality	Per design basis for systems listed in Table 1-1	N/A	*Standardized* Advanced NUHOMS® FSAR Section 6
Decommissioning	Minimize potential contamination	Normal (Same)	*Standardized* Advanced NUHOMS® FSAR Section 14 Minimize potential contamination
Materials Handling and Retrieval Capability	Cask/canister handling system prevent breach of confinement boundary under all conditions Storage system allows ready retrieval of canister for shipment off-site	Normal (Same)	*Standardized* Advanced NUHOMS® FSAR Section 2.5.1 Cask/canister handling system prevent breach of confinement boundary under all conditions Storage system allows ready retrieval of canister for shipment off-site

Notes

1. Not Used
2. Not Used
3. 75g Side drop and 25g corner is equivalent to 80 inch drop.
4. In accordance with 10 CFR 72.104(a)(3) limits include any other radiation from uranium fuel cycle operations within the region.

All Indicated Changes are for Consistency

B.5.3 References

B.5-1 U.S. Nuclear Regulatory Commission, "Certificate of Compliance No. 9255, Revision 12 for the Model No. NUHOMS®-MP187 Multi-Purpose Cask (Docket 71-9255).

B.5-2 Proposed SNM-1050, WCS Consolidated Interim Storage Facility Technical Specifications, Amendment 0.

B.5-3 "Post Transport Package Evaluation," QP-10.02, Revision *2*.

All Indicated Changes are for Consistency

B.6. WASTE CONFINEMENT AND MANAGEMENT

No change or additional information required for the *Standardized* Advanced NUHOMS® System containing the NUHOMS® 24PT1-DSCs for Chapter 6.

All Indicated Changes are for Consistency

B.7.5 Seismic Reconciliation of the *Standardized* Advanced NUHOMS® 24PT1 DSC and AHSM Storage Components and the MP187 Transfer Cask

The site-specific seismic ground motion developed for the WCS CISF in the form of the 10,000-year return period uniform hazard response spectra for the horizontal and vertical directions are described in Chapter 2.

As described in Section 2.2.3.1 of [B.7-1] the design basis seismic design criteria for the canister and AHSM components consists of the standard NRC Regulatory Guide 1.60 response spectrum shape anchored at a ZPA of 1.5g for the horizontal direction. The vertical spectrum is set at two-thirds of the horizontal direction over the entire frequency range. The horizontal and vertical spectra are specified at the top of the basemat. The horizontal and vertical components of the design response spectra, at 4% damping, are shown in Figure 2.2-1 and Figure 2.2-2 of [B.7-1].

A comparison of the seismic design basis for the Standardized Advanced NUHOMS® components and the ±15% peak broadened response spectra obtained at the center of gravity (CG) level from the soil structure interaction analysis of the pad are shown in Figure B.7-2 for the horizontal and vertical directions.

As shown in Figure B.7-2, the design basis seismic criteria for the canister and AHSM significantly exceed the seismic criteria for the AHSMs and 24PT1s on the pad. Hence, the canister and the AHSM designs have significant margins and no reconciliation for seismic loads needs to be performed for these components.

As discussed in Appendix A.7, the design basis response spectra for the MP187 cask is the standard NRC Regulatory Guide 1.60 spectrum shape anchored at 0.25g for the horizontal direction and 0.17g for the vertical direction. These spectra are compared to the WCS CISF site-specific spectra in Figure A.7-1, for damping values of 3%, 5%, and 7%. The WCS CISF site-specific spectra are compared to the ±15% peak broadened response spectra at the HSM base, which are obtained from the soil-structure interaction analysis of the pad, in Figure A.7-5 and A.7-6 for a damping value of 3%.

The discussion in Section B.7.3 demonstrates the similarity of the canister, described in [B.7-1], and the FO- DSC, described in [B.7-4]. Therefore, the seismic reconciliation of the MP187 cask loaded with a bounding FO-, FC- and FF- DSC presented in Section A.7.5.1 is applicable to the MP187 cask loaded with a 24PT1 DSC.

Table B.11-1
Canister Confinement Boundaries

Accessible Portions	Inaccessible Portions
Standardized *Advanced* NUHOMS® System Canisters NUHOMS® 24PT1	
• Shell • Shell long seam welds • Shell circumferential welds, if present	• Inner Bottom Cover Plate (IBCP) • IBCP to Shell weld • Siphon and Vent block (S&VB) • S&VB Cover Plates • Inner Top Cover Plate (ITCP) • ITCP to shell weld • S&VB Cover to S&VB welds • S&VB to Shell weld

All Indicated Changes are for Consistency

C.5.3 References

C.5-1 U.S. Nuclear Regulatory Commission, "Certificate of Compliance No. 9302, Revision 7 for the Model No. NUHOMS®-MP197 and NUHOMS®-MP197HB Packages (Docket 71-9302).

C.5-2 Proposed SNM-1050, WCS Consolidated Interim Storage Facility Technical Specifications, Amendment 0.

C.5-3 "Post Transport Package Evaluation," QP-10.02, Revision *2*.

All Indicated Changes are for Consistency

D.5.3 References

D.5-1 U.S. Nuclear Regulatory Commission, "Certificate of Compliance No. 9302, Revision 7 for the Model No. NUHOMS®-MP197 and NUHOMS®-MP197HB Packages (Docket 71-9302).

D.5-2 Proposed SNM-1050, WCS Consolidated Interim Storage Facility Technical Specifications, Amendment 0.

D.5-3 "Post Transport Package Evaluation," QP-10.02, Revision *2*.

All Indicated Changes are for Consistency

E.5.1.3 Removal of the Transportable Storage Canister from the Vertical Concrete Cask

Removal of the loaded canister from the concrete cask is expected to occur at the time of shipment of the canistered fuel off site. Alternately, removal could be required in the unlikely event of an accident condition that rendered the concrete cask or canister unsuitable for continued long-term storage or for transport. This procedure identifies the general steps to return the loaded canister to the transfer cask and return the transfer cask to the decontamination station, or other designated work area. Since these steps are the reverse of those undertaken to place the canister in the concrete cask, as described in Section E.5.1.1, they are summarized here. The procedure assumes that the inlet and outlet screens and the temperature-sensing instrumentation, if installed, have been removed.

Mechanical operation steps of the procedure may be performed in an appropriate sequence to allow for operational efficiency. Changing the order of these steps, within the intent of the procedures, has no effect on the safety of the canister removal process and does not violate any requirements stated in the Technical Specifications.

At the option of the user, the canister may be removed from the concrete cask and transferred to another concrete cask or to the NAC-STC transport cask at the ISFSI site. This transfer is done using the transfer cask, which provides shielding for the canister contents during the transfer. *Only one NAC transfer cask (NAC-MPC, NAC-UMS or MAGNASTOR transfer cask) may contain a canister at any one time at the CISF.*

1. Move the concrete cask from the ISFSI pad using the vertical concrete cask transporter.

   Caution: Do not exceed a maximum lift height of 6 inches when raising the concrete cask.

2. Move the transporter to the cask receiving area or other designated work station.

3. Remove the concrete cask shield plug and lid. Install the hoist rings in the canister structural lid. Verify that the hoist ring threads are fully engaged and torque the hoist rings as required in Table 8.1-2 of Reference E.5-1. Attach the lift slings. Install the transfer adapter.

4. Retrieve the transfer cask and position it on the transfer adapter on the top of the concrete cask.

   Note: The minimum temperature of the surrounding air must be verified to be higher than 0°F prior to lifting.

5. Open the shield doors. Attach the canister lift slings to the site approved crane hook.

All Indicated Changes are to address 72.122(b)

E.5.1.4.3 Unloading the Transportable Storage Canister from the NAC-STC Transport Cask

A transfer cask is used to unload the transportable storage canister from the transport cask and to transfer it to a storage or disposal overpack. The transfer cask retaining ring or retaining blocks must be installed. *Only one NAC transfer cask (NAC-MPC, NAC-UMS or MAGNASTOR transfer cask) may contain a canister at any one time at the CISF.*

The procedures for unloading the transportable storage canister from the NAC-STC Transport Cask are:

1. Install the canister lifting system the transportable storage canister structural lid.

   Caution: The structural lid may be thermally hot.

2. Attach the canister lifting system to the structural lid and position it to allow engagement to the crane hook/sling.

3. Attach the transfer cask lifting yoke to the cask-handling crane hook and engage the yoke to the lifting trunnions of the transfer cask.

4. Lift the transfer cask and move it above the NAC-STC Transport Cask.

5. Lower the transfer cask to engage actuators of the transfer adapter. Remove the door stops.

6. Once the transfer cask is fully seated, remove the transfer cask lifting yoke and store it in the designated location.

7. Install the transfer cask shield door hydraulic operating system to the actuators and open the transfer cask shield doors.

8. Lower the canister lifting system, the transfer cask and engage the canister lifting sling, or raise the sling set to engage to the hook above the top of the transfer cask.

9. Continue operations to place the canister in an approved storage configuration.

2. Lift the loaded concrete cask and move it to the ISFSI pad following the approved onsite transport route.

   Note: Ensure vertical cask transporter lifts the concrete cask evenly using the two lifting lugs.

   Note: Do not exceed the maximum lift height for a loaded concrete cask of 6 inches.

3. Move the concrete cask into position over its intended ISFSI pad storage location. Ensure the surface under the concrete cask is free of foreign objects and debris.

4. Using the vertical transporter, slowly lower the concrete cask into position.

   Note: Ensure that the centerline spacing between concrete casks is 15 feet minimum.

5. Disengage the vertical transporter lift connections from the two concrete cask-lifting lugs. Move the cask transporter from the area.

E.5.2.3 Removal of the Transportable Storage Canister from the Vertical Concrete Cask

Removal of the loaded canister from the concrete cask is expected to occur at the time of shipment of the canistered fuel off site. Alternately, removal could be required in the unlikely event of an accident condition that rendered the concrete cask or canister unsuitable for continued long-term storage or for transport. This procedure identifies the general steps to return the loaded canister to the transfer cask and return the transfer cask to the decontamination station, or other designated work area. Since these steps are the reverse of those undertaken to place the canister in the concrete cask, as described in Section E.5.2.1, they are summarized here. The procedure assumes that the inlet and outlet screens and the temperature-sensing instrumentation, if installed, have been removed.

Mechanical operation steps of the procedure may be performed in an appropriate sequence to allow for operational efficiency. Changing the order of these steps, within the intent of the procedures, has no effect on the safety of the canister removal process and does not violate any requirements stated in the Technical Specifications.

At the option of the user, the canister may be removed from the concrete cask and transferred to another concrete cask or to the NAC-STC transport cask at the ISFSI site. This transfer is done using the transfer cask, which provides shielding for the canister contents during the transfer. *Only one NAC transfer cask (NAC-MPC, NAC-UMS or MAGNASTOR transfer cask) may contain a canister at any one time at the CISF.*

1. Move the concrete cask from the ISFSI pad using the vertical concrete cask transporter.

4. Using the vertical transporter, slowly lower the concrete cask into position.

Note: Ensure that the centerline spacing between concrete casks is 15 feet minimum.

5. Disengage the vertical transporter lift connections from the two concrete cask-lifting lugs. Move the cask transporter from the area.

F.5.1.3 Removal of the Transportable Storage Canister from the Vertical Concrete Cask

Removal of the loaded canister from the vertical concrete cask is expected to occur at the time of shipment of the canistered fuel off site. Alternately, removal could be required in the unlikely event of an accident condition that rendered the concrete cask or canister unsuitable for continued long-term storage or for transport. This procedure identifies the general steps to return the loaded canister to the transfer cask and return the transfer cask to the decontamination station, or other designated work. area or facility. Since these steps are the reverse of those undertaken to place the canister in the concrete cask and move the concrete cask to the ISFSI, as described in Sections F.5.1.1 and F.5.1.2, they are only summarized here. The procedure assumes that the inlet and outlet screens and the temperature-sensing instrumentation, if installed, have been removed.

Mechanical operation steps of the procedures in this section may be completed out of sequence to allow for operational efficiency. Changing the order of these steps, within the intent of the procedures, has no effect on the safety of the canister removal process and does not violate any requirements stated in the Technical Specifications.

At the option of the user, the canister may be removed from the concrete cask and transferred to another concrete cask or to the Universal Transport Cask at the ISFSI site. This transfer is done using the transfer cask, which provides shielding for the canister contents during the transfer. *Only one NAC transfer cask (NAC-MPC, NAC-UMS or MAGNASTOR transfer cask) may contain a canister at any one time at the CISF.*

1. Move the loaded concrete cask from the ISFSI pad using the vertical concrete cask transporter.

Caution: Do not exceed a maximum lift height of 24 inches when raising the concrete cask.

2. Move the transporter and loaded concrete cask to the cask receiving area or other designated workstation.
3. Remove the concrete cask shield plug and lid. Install the hoist rings in the canister structural lid. Verify that the hoist ring threads are fully engaged and torque the hoist rings as required in Table 8.1.1-2 of Reference F.5.2-1. Attach the canister lift slings.
4. Install the transfer adapter on the top of the concrete cask. Retrieve the transfer cask and position it on the transfer adapter on the top of the concrete cask.

All Indicated Changes are to address 72.122(b)

F.5.1.4.2 Preparing to Unload the Transportable Storage Canister from the NAC-UMS Transport Cask

The assumptions underlying this procedure are:

- The NAC-UMS Transport Cask is in a vertical position in the designated unloading area.
- The top of the NAC-UMS Transport Cask is accessible.

The procedures for preparing to unload the transportable storage canister from the NAC-UMS Transport Cask are:

1. Remove the vent port coverplate bolts and attach a pressure test fixture to the vent port to measure the pressure in the cask.
2. Using an evacuated vacuum bottle attached to the pressure test fixture, sample the gas in the cask cavity.

Caution: Use caution in opening the cask if the sample activity and/or cask pressure are higher than expected based on the canister contents configuration.

3. Vent the cask cavity gas to the gaseous waste handling system or through an appropriate HEPA filter system and disconnect the pressure test fixture from the vent port.
4. Remove the NAC-UMS Transport Cask lid bolts by following the reverse of the installation torquing sequence, install the two closure lid alignment pins, and install the lifting eyes in the cask lid and attach the lid-lifting device to the cask lid and to the overhead crane.
5. Remove the transport cask lid and place the lid in a designated area. [Ensure that the O-ring grooves in the lid are protected so that they will not be damaged during handling.] Decontaminate the lid as necessary.
6. Remove the two alignment pins and install the transfer adapter to the top of the transport cask.

F.5.1.4.3 Unloading the Transportable Storage Canister from the NAC-UMS Transport Cask

A transfer cask is used to unload the transportable storage canister from the transport cask and to transfer it to a storage or disposal overpack. The transfer cask retaining ring or retaining blocks must be installed. *Only one NAC transfer cask (NAC-MPC, NAC-UMS or MAGNASTOR transfer cask) may contain a canister at any one time at the CISF.*

The procedures for unloading the transportable storage canister from the NAC-UMS Transport Cask are:

1. Install the canister lifting system to the transportable storage canister structural lid.

All Indicated Changes are to address 72.122(b)

13. Perform a radiological survey of the concrete cask within the ISFSI array to confirm dose rates comply with ISFSI administrative boundary and site boundary dose limits.

14. Initiate a daily temperature monitoring program or daily inspection program of the inlet and outlet screens to verify continuing effectiveness of the heat removal system.

G.5.1.3 Removing the Loaded TSC from a Concrete Cask

This procedure assumes the loaded concrete cask is returned to the reactor loading facility for unloading. However, transfer of the TSC to another concrete cask can be performed at the ISFSI without the need to return to the loading facility, provided a cask transfer facility that meets the requirements specified in the Technical Specifications is available.

As the steps to move a loaded concrete cask are essentially the reverse of the procedures in Section G.5.1.1 and Section G.5.1.2, the procedural steps are only summarized here. *Only one NAC transfer cask (NAC-MPC, NAC-UMS or MAGNASTOR transfer cask) may contain a canister at any one time at the CISF.*

1. Remove inlet and outlet screens and temperature measuring equipment (if installed).

   Note: The minimum ambient air temperature (either in the facility or external air temperature, as applicable for the handling sequence) must be ≥ 0ºF for the use of the concrete cask, per Section 4.3.1.g. of the MAGNASTOR Technical Specifications.

2. For concrete casks to be transported by a vertical cask transporter, remove anchor cavity cover plates, remove the lid assembly bolts, and install the lift lugs. Torque the lift lug bolts for each lift lug to the value specified in Table 9.1-2 of Reference G.5-1. Attach the concrete cask to the vertical cask transporter.

3. For concrete casks to be transported on a flat-bed vehicle, install an air pad rig set in the inlets. Inflate the air pads and move concrete cask onto the vehicle deck.

   Note: Ensure that air pads are not installed longer than eight hours to complete concrete cask transfer.

4. Move the loaded concrete cask to the facility.

5. Remove the concrete cask lid. Install concrete cask shield ring, if required.

6. Install the six hoist rings into the canister closure lid threaded holes. Remove shield ring, if installed.

   Note: Utilize high temperature-resistant slings (≤ 350°F)

All Indicated Changes are to address 72.122(b)

4. Install and torque swivel hoist rings, as specified, in the four threaded lifting holes in the cask lid. Install and hand-tighten the lid alignment pins in their designated hole locations.

5. Attach an appropriate lid sling set to the swivel hoist rings (or equivalent site-specific approved lid lifting system) and a suitable crane. Lift and remove the cask lid. Decontaminate and store the lid to prevent damage to the seal surfaces and cask cavity spacer, if installed. Record the time the lid is removed.

Caution: In order to ensure that the fuel clad temperatures do not exceed 400ºC, as established by ISG-11, Revision 3, a fuel TSC containing maximum heat load contents (i.e., PWR - 23 kW; BWR - 22 kW) shall be removed from the MAGNATRAN following cask lid removal and placed in a safe condition (i.e., in a MTC or equivalent transfer device). The maximum time to complete the operational sequence shall be < 6 hours. This maximum transfer and preparation time is not applicable to the loading of GTCC waste TSCs as the ISG-11 temperature limits are not applicable.

G.5.1.4.3 Unloading the transportable storage canister (TSC) from the MAGNATRAN Transport Cask

A transfer cask (MTC) is used to unload the transportable storage canister (TSC) from the transport cask and to transfer it to a storage or disposal overpack. The transfer cask retaining ring or retaining blocks must be installed. *Only one NAC transfer cask (NAC-MPC, NAC-UMS or MAGNASTOR transfer cask) may contain a canister at any one time at the CISF.*

The procedures for unloading the transportable storage canister from the MAGNATRAN Transport Cask are:

1. Remove the lid alignment pins, and using a suitable crane and sling set, install the transfer shield ring in the lid recess.

   Note: The transfer shield ring aligns the transfer adapter to the cask cavity, provides additional side shielding and protects the cask lid seating surface from damage.

2. Position the transfer adapter on the top of the transport cask and connect the shield door ancillary hydraulic actuation system.

3. Install the TSC lifting system swivel hoist rings and lifting slings (or other appropriate TSC lifting system meeting the facility's heavy load program) to the threaded holes in the TSC closure lid and torque as specified.

4. Using the MTC lift yoke, lift the empty MTC and place it on the transfer adapter on top of the transport cask. Ensure that the connector assemblies are in the engaged position. Remove the door stops.

All Indicated Changes are to address 72.122(b)