

## Canister Licensing Histories

### NUHOMS®-MP187 Cask System

NUHOMS®-MP187 Cask System consists of the following canister designs authorized to be stored at the WCS CISF: GTCC canister, FO-DSC, FC-DSC and FF-DSC.

The licensing basis for the FO-DSC, FC-DSC and FF-DSC is documented in site specific Materials License SNM-2510. The canisters were licensed under the original license. There have been three amendments to the Materials License. As this is a site specific license all of loaded canisters are being stored under Amendment 3 of SNM-2510.

### Standardized Advanced NUHOMS® System

The only canister authorized to be stored at the WCS CISF from the Standardized Advanced NUHOMS® System is the 24PT1-DSC. The licensing basis for the 24PT1-DSC is documented in Certificate of Compliance (CoC) Number 1029. The 24PT1-DSC was included in the initial CoC. The table below provides a description of the changes associated with the 24PT1-DSC for each amendment. The most current amendment to CoC Number 1029 is Amendment 3.

CoC Number 1029 - Amendment	Description of changes to 24PT1-DSC
Initial Issue	24PT1 included in original license
Amendment 1	None, this amendment added a second canister type (24PT4) which is not included as an authorized canister to be stored at the WCS CISF.
Amendment 2	Withdrawn, no impact on 24PT1.
Amendment 3	None, this amendment added a third canister type (32PTH2) which is not included as an authorized canister to be stored at the WCS CISF.

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### Standardized NUHOMS® 61BT System

The NUHOMS®-61BT DSC is authorized to be stored at the WCS CISF from the Standardized NUHOMS®-61BT System. The licensing basis for the 61BT DSC is documented in CoC Number 1004. The 61BT DSC was added to CoC number 1004 in Amendment 3. The table below provides a description of the changes associated with the 61BT DSC for each of the subsequent amendments. The most current amendment to CoC Number 1004 is Amendment 13.

CoC Number 1004 - Amendment	Description of changes to 61BT DSC
Amendment 3	This amendment added the 61BT DSC to the license (Appendix K of the FSAR.)
Amendment 4	None, the amendment revised the authorized contents to the NUHOMS®-24P DSC only.
Amendment 5	None, the amendment added the NUHOMS®-32PT DSC only.
Amendment 6	None, the amendment added the NUHOMS®-24PHB DSC only.
Amendment 7	The principle requested change was to add new fuel types and damaged fuel to the list of authorized contents for the Standardized NUHOMS®-61 BT System. (Added end caps to canister design)
Amendment 8	None, the amendment added the 24PTH system which consists of new or modified components: (1) the 24PTH dry shielded canister (DSC); (2) a new 24PTH DSC basket design; (3) a modified horizontal storage module (HSM), designated the HSM-H; and (4) a modified transfer cask, designated the OS 197FC TC.
Amendment 9	The amendment updated the authorized contents of a 61BT DSC to include the Framatome-ANP Version 9x9-2 fuel assemblies (FANP9 9x9-2). (No changes to the canister)
Amendment 10	None, this amendment added the NUHOMS® 61BTH DSC and accompanying changes to accommodate this DSC; added the NUHOMS® 32PTH1 DSC and accompanying changes to accommodate this DSC; added an alternate high-seismic option of the horizontal storage module (HSM) for storing the 32PTH1 DSC; added the Westinghouse 15x15 Partial Length Shield Assemblies to the authorized contents of the NUHOMS®-24PTH DSC; and added Control Components to the authorized contents of the NUHOMS® 32PT DSC.
Amendment 11	None, this amendment added the OS197L transfer cask to the license.
Amendment 12	Withdrawn, no impact on 61BT DSC.

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CoC Number 1004 - Amendment	Description of changes to 61BT DSC
Amendment 13	<p>The only related changes were to allow the 61BT DSC to be stored in the high seismic horizontal storage module (HSM-HS) and to add to the authorized contents of the 61BT DSC.</p> <p>The following is a list of the primary changes to the license including those that do not impact the 61BT DSC: (1) to add a new dry shielded canister (DSC), the 69BTH, (2) to add a new DSC, the 37PTH, (3) to add control components other than burnable poison rod assemblies (BPRAs), damaged fuel assemblies, and non-zircaloy cladding/guide tubes, as approved contents to the 24PHB DSC, (4) to add high burn-up fuel assemblies with and without control components as approved contents to the 32PT DSC, (5) to add failed fuel as approved contents to the 61BTH and 24PTH DSCs, (6) to extend the use of the high-seismic horizontal storage module (HSM-HS) for storage of the 61BT, 32PT, 24PTH, 61BTH, 69BTH and 37PTH DSCs, (7) to extend the use of metal matrix composites (MMCs) as a neutron absorber material in the 61BTH Type 1 and Type 2 DSCs for higher heat loads, (8) to add blended low enriched uranium (BLEU) fuel assemblies as approved contents, (9) and other changes as described in this Safety Evaluation Report (SER).</p>

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### Standardized NUHOMS® 61BTH Type 1 System

The NUHOMS®-61BTH Type 1 DSC is authorized to be stored at the WCS CISF from the Standardized NUHOMS®-61BTH Type 1 System. The licensing basis for the 61BTH Type 1 DSC is documented in CoC Number 1004. The 61BTH Type 1 DSC was added to CoC number 1004 in Amendment 10. The table below provides a description of the changes associated with the 61BTH Type 1 DSC for each of the subsequent amendments. The most current amendment to CoC Number 1004 is Amendment 13.

CoC Number 1004 - Amendment	Description of changes to 61BT DSC
Amendment 10	This amendment added the 61BTH Type 1 DSC to the license (Appendix T of the FSAR.) along with other canisters and changes.
Amendment 11	None, this amendment added the OS197L transfer cask to the license.
Amendment 12	Withdrawn, no impact on 61BTH Type 1 DSC.
Amendment 13	<p>The related changes were to 1) allow the 61BTH Type 1 DSC to be stored in the high seismic horizontal storage module (HSM-HS; 2) Extend the application of metal matrix composite (MMC) as a neutron absorber material in the 61BTH Type 1 for higher heat loads and 3) to add failed fuel to the authorized contents of the 61BTH Type 1.</p> <p>The following is a list of the primary changes to the license including those that do not impact the 61BTH Type 1 DSC: (1) to add a new dry shielded canister (DSC), the 69BTH, (2) to add a new DSC, the 37PTH, (3) to add control components other than burnable poison rod assemblies (BPRAs), damaged fuel assemblies, and non-zircaloy cladding/guide tubes, as approved contents to the 24PHB DSC, (4) to add high burn-up fuel assemblies with and without control components as approved contents to the 32PT DSC, (5) to add failed fuel as approved contents to the 61BTH and 24PTH DSCs, (6) to extend the use of the high-seismic horizontal storage module (HSM-HS) for storage of the 61BT, 32PT, 24PTH, 61BTH, 69BTH and 37PTH DSCs, (7) to extend the use of metal matrix composites (MMCs) as a neutron absorber material in the 61BTH Type 1 and Type 2 DSCs for higher heat loads, (8) to add blended low enriched uranium (BLEU) fuel assemblies as approved contents, (9) and other changes as described in this Safety Evaluation Report (SER).</p>

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### NAC-MPC System

The NAC-MPC system is authorized to be stored at the WCS CISF. The licensing basis for the NAC-MPC system is documented in CoC Number 1025. The table below provides a brief description of the changes associated with the NAC-MPC for each of the subsequent amendments. The most current amendment to CoC Number 1025 is Amendment 6.

CoC Number 1025 - Amendment	Description of changes to the NAC-MPC System
Initial Issue	Authorized the Yankee Rowe fuel and cask design.
Amendment 1	This amendment made enhancements to support the Yankee Rowe project by allowing an alternate fuel basket design, increased canister loading operational time limits, and an increase in the canister surface contamination limits.
Amendment 2	This amendment was to authorize the Connecticut Yankee fuel and canister design.
Amendment 3	This amendment made changes to support both the Yankee Rowe and Connecticut Yankee projects by incorporating Yankee Class fuel parameters, damaged fuel cans, recaged assemblies, and corrections to the Connecticut Yankee fuel parameters.
Amendment 4	The changes made included increasing the vacuum drying time limits, increasing the canister in transfer cask time limits, revising fuel cooldown requirements, deleting the canister removal from concrete cask requirements, revising surface contamination removal time limits, and revising allowable contents fuel assembly limits.
Amendment 5	The changes made included a revision to the technical specifications to incorporate changes to the reporting and monitoring requirements, incorporated guidance from NRC ISG-22, removal of the requirement for installation of tamper-indicating devices on the VCC, and several editorial changes.
Amendment 6	The amendment was to authorize the LACBWR fuel and various design enhancements to support LaCrosse project.

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### NAC-UMS System

The NAC-UMS system is authorized to be stored at the WCS CISF. The licensing basis for the NAC-UMS system is documented in CoC Number 1015. The table below provides a brief description of the changes associated with the NAC-UMS for each of the subsequent amendments. The most current amendment to CoC Number 1015 is Amendment 5.

CoC Number 1015 - Amendment	Description of changes to the NAC-UMS System
Initial Issue	Initial authorization for the cask design with generic PWR and BWR fuel.
Amendment 1	This amendment was for the Maine Yankee project and included changes to support the fuel at Maine Yankee.
Amendment 2	Changes were made to support the Maine Yankee project by storing various components associated with the spent fuel assemblies, deletion of the requirement to place a TSC in the transfer cask if the associated VCC's vents cannot be unblocked, and various editorial, administrative, and corrections to the technical specifications.
Amendment 3	The changes made included adding METAMIC as an alternate poison material, increasing the BWR fuel weight, increasing the design basis earthquake levels, modifications to the transfer cask trunnion design, revised fuel assembly dimensions for the generic PWR and BWR fuel, extended operating time limits for vacuum drying, canister in transfer cask, helium backfill, forced air cooling and in pool cooling, revised the allowable fuel cladding temperature limit to reflect ISG-11, Rev. 2, increased the PWR fuel enrichment limits, and various editorial and administrative changes.
Amendment 4	The changes made included (1) to replace the specific term "zircaloy" with the more generic term "zirconium alloy;" (2) to revise the definitions of OPERABLE and SITE SPECIFIC FUEL; (3) to revise vacuum drying pressure and time limits; (4) to revise the short-term temperature limits and completion times for the concrete cask heat removal system; (5) to clarify the surface dose rate surveillance frequency; (6) to add an option for restoring the dissolved boron concentration; (7) to delete the redundant administrative control for boron concentration; (8) to add an alternate site-specific design basis earthquake (DBE) analysis for unbounded site conditions; and (9) to incorporate editorial and administrative changes.

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CoC Number 1015 - Amendment	Description of changes to the NAC-UMS System
Amendment 5	<p>Changes were made to allow for storage of high burnup PWR fuel (up to 60 GWd/MTU assembly average burn up). The other amendment changes were: 1) elimination of the requirement for the use of a tamper-indicating seal on the concrete cask lid bolts; 2) elimination of the technical specification requirement (Limiting Condition for Operation [LCO] A 3.1.5) for the helium leakage test of the canister shield lid to canister shell weld; 3) revision of the technical specification written reporting requirement to 60 days (was 30 days); 4) elimination of the requirement for Charpy V-notch impact testing of the 0.625-inch nominal thickness BWR support disk material (SA 533, Type B, Class 2); and 5) revised Delta note 8 on license drawing 790-585 to make the use of the structural lid and shield lid threaded plugs and dowel pins optional. 6) reinstate the helium leak testing requirements; 7) revise the definitions of intact and damaged fuel to conform with the ISG-1, Rev. 2; and 8) revise the technical specification requirements to limit potential thermal cycling of the fuel cladding to conform with ISG-11, Rev. 3.</p>

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### MAGNASTOR System

The MAGNASTOR system is authorized to be stored at the WCS CISF. The licensing basis for the MAGNASTOR system is documented in CoC Number 1031. The table below provides a brief description of the changes associated with the MAGNASTOR for each of the subsequent amendments. The most current amendment to CoC Number 1031 is Amendment 5.

CoC Number 1031 - Amendment	Description of changes to the MAGNASTOR System
Initial Issue, Rev. 1	<p>Initial approval with a capacity of up to 37 pressurized water reactor (PWR) or 87 boiling water reactor (BWR) undamaged spent fuel assemblies.</p> <p>Revision 1 revised Table B2-5 for minimum additional decay time required for the spent fuel when the fuel contains nonfuel hardware, and a correction of typographical errors in two required minimum actual areal boron densities in Technical Specification 4.1.1 (a).</p>
Amendment 1, Rev. 1	<p>The changes made were to the acceptance testing for the Boral neutron absorber sheets.</p> <p>Revision 1 revised Table B2-5 for minimum additional decay time required for the spent fuel when the fuel contains nonfuel hardware, and a correction of typographical errors in two required minimum actual areal boron densities in Technical Specification 4.1.1 (a).</p>
Amendment 2, Rev. 1	<p>The changes made were to add additional boron-10 (<sup>10</sup>B) areal densities for use with pressurized water reactor (PWR) and boiling water reactor (BWR) baskets, a correction of the code reference in Table 2.1-2 of the Final Safety Analysis Report (FSAR), table entitled "ASME Code Alternatives for MAGNASTOR® components", a change of transportable storage canister (TSC) surface contamination limits for loose contamination, editorial corrections in the FSAR to reflect the various <sup>10</sup>B areal densities for use with PWR and BWR baskets, the replacement of item d) "Minimum fuel tube orthogonal (x, y) pitch" by "Minimum fuel tube outer diagonal dimension" in Section 4.0, Design Features, Subsection 4.1.1, Criticality Control (affected page was A4-1); and a correction of the reference to 10 CFR 72.212(b)(2)(i)(C) to read 10 CFR 72.212(b)(5)(iii) in Section 5.5, Radiation Protection Program, item 5.5.3 on page A5-3.</p> <p>Revision 1 revised Table B2-5 for minimum additional decay time required for the spent fuel when the fuel contains nonfuel hardware, and a correction of typographical errors in two required minimum actual areal boron densities in Technical Specification 4.1.1 (a).</p>

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CoC Number 1031 - Amendment	Description of changes to the MAGNASTOR System
<p>Amendment 3, Rev. 1</p>	<p>The changes made were the inclusion of damaged fuel contained in damaged fuel cans (DFCs) that are placed in a damaged fuel (DF) basket assembly, authorization for intact fuel assemblies to contain nonfuel hardware per the expanded definition in this application, and intact fuel assemblies may contain up to five activated stainless steel fuel replacement rods at a maximum burnup/exposure of 32.5 GWd/MTU. This amendment also revised Paragraph 4.3.1 (i), Appendix A, "Technical Specifications and Design Features for the MAGNASTOR® System," to clarify that the maximum design basis earthquake accelerations of 0.37g in the horizontal direction (without cask sliding) and 0.25g in the vertical direction at the independent spent fuel storage installation (ISFSI) pad top surface do not result in cask tip-over.</p> <p>Revision 1 revised Table B2-5 for minimum additional decay time required for the spent fuel when the fuel contains nonfuel hardware, and a correction of typographical errors in two required minimum actual areal boron densities in Technical Specification 4.1.1 (a).</p>
<p>Amendment 4</p>	<p>The changes made were to revise the time to transfer a canister and backfill with helium in Limiting Condition for Operation (LCO) 3.1.1, a revision to the decay times in Technical Specification, Appendix B, Table B2-5 for minimum additional decay time required for the spent fuel when the fuel contains nonfuel hardware, and a correction of typographical errors in two required minimum actual areal boron densities in Technical Specification 4.1.1 (a).</p>

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CoC Number 1031 - Amendment	Description of changes to the MAGNASTOR System
<p>Amendment 5</p>	<p>The changes made were to:</p> <ol style="list-style-type: none"> <li>1. Incorporate Combustion Engineering 16x16 (CE16x16) damaged fuel.</li> <li>2. Revise the contents to state unirradiated (instead of unenriched) BWR fuel assemblies are not authorized for loading.</li> <li>3. Revise the BWR 82-assembly loading profile by adding alternate profile that allows General Electric 14 (GE14) fuel assemblies to be loaded with a maximum enrichment of 4.55 weight percent.</li> <li>4. Include a BWR 86-assembly loading profile that allows General Electric 13 (GE13) fuel assemblies to be loaded with a maximum enrichment of 3.85 weight percent.</li> <li>5. Include a new pressurized-water reactor (PWR) preferential loading profile, which includes 4-zones and retains the maximum currently licensed canister heat load of 35.5 kW.</li> <li>6. Include new cool time tables, specifically for Westinghouse 14x14 (WE14x14) and CE16x16 PWR fuel that allows reduced cool times.</li> <li>7. Include new minimum cool times, specifically for Westinghouse Control Element Assemblies (CEA) and rod cluster control assemblies (RCCAs) down to 2.5 yr.</li> <li>8. Remove the PWR short loading cell callouts that were incorporated into Amendment No.3.</li> <li>9. Remove statements in Appendix B of the technical specifications for the BWR 82-assembly loading configuration that defines the means by which the empty cells are blocked.</li> <li>10. Remove callouts in figures within Appendix B of the technical specifications that show the canister alignment tick mark.</li> <li>11. Revise the cask surface dose rate shown in Limiting Conditions for Operation (LCO) 3.3.1 from 95 mrem/hour gamma to 120 mrem/hour gamma.</li> <li>12. Revise Technical Specification, Appendix A, Section 4.3.1(i), to allow a MAGNASTOR@ system to be utilized at sites where the design basis earthquake (DBE) acceleration is greater than 0.379 in the horizontal direction and 0.259 in the vertical direction provided that the independent spent fuel storage installation (ISFSI) pad is designed with bollards that prevent a cask from overturning, sliding into adjacent casks or sliding off the ISFSI pad.</li> <li>13. Revised decay times in Technical Specification, Appendix B Table B2-5 for minimum additional decay time required for the spent fuel when the fuel contains nonfuel hardware.</li> <li>14. Corrected typographical error in two actual boron loadings in Technical Specification 4.1.1(a).</li> </ol>