

Revision 4 of the HI-STAR 100 FSAR for LAR 3 does not follow the format prescribed in Revision 1 of NUREG-1536. However, the major technical updates incorporated in Revision 1 of NUREG-1536 have been included in the FSAR. The table below identifies the applicable interim staff guidance (ISG) incorporated in NUREG-1536 Revision 1 and where the information is contained in the FSAR.

ISG # & Rev	Title	NUREG 1536 Revision 1 Status	Discussion
ISG 1 Rev. 2	Damaged Fuel	Added	<p>ISG 1 Rev 2 provides guidance on classifying spent nuclear fuel as damaged, undamaged, or intact.</p> <p>The definitions related to spent nuclear fuel classification are provided in Appendix A of the proposed CoC for HI-STAR 100 LAR 3.</p>
ISG 2 Rev. 1	Fuel Retrievability	Added	<p>ISG 2 Rev 1 provides guidance for determining if storage systems licensed under 10CFR Part 72 allow ready retrieval of spent fuel.</p> <p>Chapter 3 of the FSAR concludes the retrievability criteria set for by 10CFR72.122(l) are met. The MPC fuel basket ensures there is not impairment of ready retrievability.</p>
ISG 3	Post Accident Recovery and Compliance with 10 CFR 72.122(l)	Added	<p>ISG 3 clarifies that 10CFR71.122(l) applies to normal and off-normal design conditions and not to accidents. The SRP eliminates references to non-credible accidents such as non-mechanistic failures of the confinement boundary.</p> <p>Chapter 11 of the HI-STAR 100 FSAR contains the accident design criteria for the HI-STAR 100 system and is in compliance with 10CFR Part 71.</p>
ISG 4 Rev. 1	Cask Closure Weld Inspections	Superseded by ISGs 15 and 18	See ISG 15 and 18.
ISG 5 Rev. 1	Confinement Evaluation	Added	<p>This ISG integrates the current staff approach to confinement evaluation. The applicable changes in revision 1 of ISG 5 includes the expanded and clarified acceptance criteria associated with confinement analysis and acceptance of “leak tight” testing instead of detailed confinement analysis.</p> <p>A confinement evaluation is not performed for the HI-STAR 100 storage system since the MPC meets the leak tight criteria from ISG-18. Table 7.1.2 of the HI-STAR 100 FSAR provides a matrix of ISG-18 criteria and how the Holtec MPC design and associated inspection, testing, and QA</p>

			requirements meet each one.
ISG 6	Establishing Minimum Initial Enrichment for the Bounding Design Basis Fuel Assembly(s)	Added	<p>ISG 6 establishes the minimum initial enrichment for the bounding design basis fuel assemblies and recommends in NUREG 1536 for the SAR to specify the minimum initial enrichment as an operating control and limit for cask use, or justify the use of a neutron source term, in the shielding analysis, that specifically bounds the neutron sources for fuel assemblies to be placed in the cask.</p> <p>Justification of the source specification used in the shielding analysis is provided in Section 5.2.2 of the HI-STAR 100 FSAR.</p>
ISG 7	Potential Generic Issue Concerning Cask Heat Transfer in a Transportation Accident	Added	Not applicable to dry fuel storage evaluations.
ISG 8 Rev. 2	Burnup Credit in the Criticality Safety Analyses of PWR Spent Fuel in Transport and Storage Casks	Not Added, but referenced	<p>ISG 8 Rev 2 addresses the allowance in the criticality safety analysis for the decrease in fuel reactivity resulting from irradiation (burn up credit).</p> <p>Burnup credit is not used in the criticality safety analysis of the HI-STAR 100 storage cask; therefore this ISG does not apply.</p>
ISG 9 Rev. 1	Storage of Components Associated with Fuel Assemblies	Added	<p>ISG 9 Revision 1 clarifies the technical criteria for types of materials that will be considered associated with the storage of spent fuel assemblies. In the Holtec storage and transportation dockets, these items are labeled “non-fuel hardware.”</p> <p>This amendment request and proposed FSAR revision does not seek to add any new non-fuel hardware to the HI-STAR 100 system. The existing approved analyses of non-fuel hardware are unchanged, and no non-fuel hardware is requested to be included in the MPC-32. All thermal, shielding, and criticality evaluations of the existing non-fuel hardware for the MPC-24 and MPC-68 is contained in Chapters 4, 5, and 6 respectively. The approved contents in the HI-STAR 100 CoC, Appendix B, clearly describe the types of non-fuel hardware authorized for storage.</p>
ISG 10 Rev. 1	Alternatives to the ASME Code	Added	Specific proposed alternatives to the codes are listed in Appendix B of the CoC as required by ISG 10 Rev 1.
ISG 11 Rev. 3	Cladding Considerations for the Transportation and	Added	Revision 3 of ISG 11 addresses the technical review aspects of and specifies the acceptance criteria for limiting spent fuel reconfiguration in

	Storage of Spent Fuel		<p>storage casks. It modifies the previous revision of the ISG in three ways (1) clarifying the meaning of some of the acceptance criteria contained in Revision 2, (2) adding acceptance criteria to allow higher cladding temperature limits for certain conditions of storage, and (3) providing justification for allowing licensees to continue to use the 570 °C cladding temperature limit for short term fuel loading operations of previously certified dry cask storage systems licensed to store low burn up spent fuel only.</p> <p>The permissible fuel cladding temperature limits for moderate and high burn up fuel under normal, accident and short term operating conditions have been updated in Revision 4 of the HI-STAR 100 FSAR to meet ISG-11 Rev 3.</p>
ISG 12 Rev. 1	Buckling of Irradiated Fuel Under Bottom End Drop Conditions	Added	<p>ISG-12 Rev 1 describes the staff's guidance on using fuel buckling analyses in the case of a cask end drop accident.</p> <p>As described in Chapter 11, the drop accident is not considered credible based on the use of single failure proof handling devices. Therefore this ISG does not apply.</p>
ISG 13	Real Individual	Added	<p>ISG 13 provides (1) clarification of the meaning of a real individual as used in 10CFR72.104 and (2) specifies how the applicant may perform dose evaluations beyond the controlled area for site-specific and general ISFI licenses, and (3) clarifies standard review plan text regarding dose calculations outside the controlled area.</p> <p>The shielding evaluation and dose acceptance criteria are presented in Chapter 5 and Chapter 10 of the HI-STAR 100 FSAR.</p>
ISG 14	Supplemental Shielding	Added	<p>ISG 14 provides guidance regarding supplemental shielding that may be installed at an ISFSI to meet the requirements of 10 CFR 72.104 (a). For casks approved for use by general licensees in accordance with 10 CFR 72 Subpart L, the Technical Specifications issued with cask approval should specify requirements to address supplemental shielding as indicated below:</p> <p>“Supplemental Shielding: In cases where engineered features (e.g. earthen berms, shield walls) are used to ensure that the requirements of</p>

			<p>10CFR72.104(a) are met, such features are to be considered important to safety and must be appropriately evaluated under 10CFR72.212(b)”</p> <p>No major technical update is introduced as part of ISG 14. Per Section 10.1.2 and 10.1.4 of the HI-STAR 100 FSAR, the licensee is responsible for site-specific compliance with 10CFR72.104 and users shall evaluate the need for supplemental shielding based on an ALARA review of each loading operations.</p>
ISG 15	Materials Evaluation	Added	<p>ISG 15 recommends that a Materials Evaluation chapter as outlined in the appendix be included in the FSAR. To preserve the formatting of the HI-STAR 100 FSAR, a dedicated materials evaluation chapter has not been included. However, the information is largely included in Chapter 3.</p>
ISG 16	Emergency Planning	NA	<p>ISG 16 reiterates that Appendix C of the draft version of NUREG-1536 provided acceptable guidance for Emergency Planning requirements, which is aligned with the requirements of 10 CFR72.32.</p> <p>No major technical updates are included in NUREG 1536 Revision 1 as part of ISG 16.</p>
ISG 17	Interim Storage of Greater than Class C Waste	NA	<p>ISG 17 provides guidance on the interim storage of greater than Class C (GTCC) waste due to the revision of 10 CFR 72. GTCC waste is permitted for storage at independent spent fuel storage installations or monitored retrievable storage facilities.</p> <p>ISG 17 is not applicable to the HI-STAR 100 storage system as it is not used to store GTCC waste.</p>
ISG 18 Rev 1	The Design & Testing of Lid Welds on Austenitic Stainless Steel Canisters as Confinement Boundary for Spent Fuel Storage	Added	<p>ISG 18 addresses the design and testing of the various closure welds (lid welds) associated with the redundant closure of all-welded austenitic stainless steel canisters. Revision 1 of ISG 18 expands the guidance to address all welds associated with the redundant closures of a spent fuel canister and describes how each individual closure weld must be considered from the overall design and testing standpoint.</p> <p>Table 7.1.2 of the HI-STAR 100 FSAR provides a matrix of ISG-18 criteria and how the Holtec MPC design and associated inspection, testing, and QA requirements meet each one.</p>
ISG 19	Moderator Exclusion Under Hypothetical Accident	NA	<p>ISG 19 provides review guidance for meeting the fissile material package standards in 10 CFR 71.55 (e), which requires a fissile material package</p>

	Conditions and Demonstrating Subcriticality of Spent Fuel Under the Requirements of 10 CFR 71.55 (e)		be subcritical under hypothetical accident conditions assuming that the fissile material is in the most reactive credible configuration. ISG 19 is not applicable to the evaluation for dry storage.
ISG 20	Transportation Package Design Changes Authorized Under 10 CFR Part 71 Without Prior NRC Approval	NA	Not applicable to the storage license.
ISG 21	Use of Computational Modeling Software	Added	ISG-21 describes staff guidance on computational modeling software, and the staff's expectations on what information should be provided for review. This amendment request and proposed FSAR revision relies only on calculations and computational models already approved by the NRC in previous amendment requests for both storage and transportation. Therefore, the computational models should be acceptable to the NRC staff. Additionally, all computational models have been created under Holtec's Quality Assurance program, which is approved by the NRC under Docket 71-0784, as described in Chapter 13 of this FSAR.
ISG 22	Potential Rod Splitting Due to Exposure to an Oxidizing Atmosphere During Short-Term Cask Loading Operations in LWR or Other Uranium Oxide Based Fuel	Added	ISG-22 discusses the potential for oxidation of fuel rods which have pinhole leaks or hairline cracks during the cask water removal process, which could potentially cause cladding breaches. The ISG presents three options for preventing fuel oxidation. The HI-STAR 100 design addresses the potential for fuel oxidation using ISG-22, option 1, which suggests maintaining the fuel rods in an appropriate environment such as Ar, N ₂ , or He to prevent oxidation. As stated in FSAR, Sub-section 1.2.2.2, the MPC water is displaced by blowing pressurized helium or nitrogen gas into the vent port. The MPC is then either vacuum dried or undergoes forced helium hydration, before being backfilled with helium. Using this process, the fuel is kept in a N ₂ or He environment to ensure oxidation does not occur.
ISG 23 (Draft)	Draft – Application of ASTM Standard Practice	Not Added	Not applicable. ISG 23 not added to NUREG-1536 Rev 1.

	C1671-07 when performing technical reviews of spent fuel storage and transportation packaging licensing actions.		
ISG 24 (Draft)	Reserved	NA	NA
ISG 25 (Draft)	Draft – Pressure and Helium Leakage Testing of the Confinement Boundary of Spent Fuel Storage Casks	Added	<p>This ISG supplements the standard review plan guidance for evaluating the helium leakage testing and ASME Code required pressure (hydrostatic/pneumatic) testing that is specified for the dry storage system confinement boundary.</p> <p>In accordance with ISG-25, the welding examination and pressure testing of the confinement boundary is performed in accordance with Section III, Division 1, Subsection NB of ASME B&PV Code. Helium leakage testing of the entire confinement boundary is performed according to ANSI N14.5, with the exception of the lid-to-shell welds defined in ISG-18. A shop helium leakage test is performed on the shell to shell and MPC shell to baseplate welds and the vent port welds are leak tested in the field (see criteria in Table 2.0.1 of the FSAR).</p> <p>The entire confinement boundary is also pressure tested to 125 or 110 percent of the design pressure, respectively. The test pressure is held for 10 minutes prior to performing a visual examination (see criteria in Table 2.0.1 and Section 8.1.6 of the FSAR).</p>
ISG 26 (Draft)	Reserved	NA	NA