PROPOSED CERTIFICATE OF COMPLIANCE NO. 1014

APPENDIX A-100U

TECHNICAL SPECIFICATIONS

FOR THE HI-STORM 100 CASK SYSTEM

(MODEL NO. 100U ADDITION)

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1.1 Definitions

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1.4 Frequency

Refer to Frequency in Appendix A

2.0

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3.0 LIMITING CONDITIONS FOR OPERATION (LCO) APPLICABILITY

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 If the LCO is met or is no longer applicable prior to expiration of the specified Completion Time(s), completion of the Required Action(s) is not required, unless otherwise stated.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.
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 or that are related to the unloading of an SFSC.
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.

3.0 SURVEILLANCE REQUIREMENT (SR) APPLICABILITY

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.

(continued)

3.0 SURVEILLANCE REQUIREMENT (SR) APPLICABILITY

SR 3.0.3 (continued)	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 or that are related to the unloading of an SFSC.

3.1 SFSC INTEGRITY

3.1.1 Multi-Purpose Canister (MPC)

LCO 3.1.1 The MPC shall be dry and helium filled.

Table 3-1 provides decay heat and burnup limits for forced helium dehydration (FHD) and vacuum drying. FHD is not subject to time limits. Vacuum drying is subject to the following time limits, from the end of bulk water removal until the start of helium backfill:

MPC Total Decay Heat (Q)	Vacuum Drying Time Limit
Q $\leq$ 26 kW	None
26 kW < Q $\leq$30 kW	40 hours
Q > 30 kW	Not Permitted (see Table 3-1)

APPLICABILITY: During TRANSPORT OPERATIONS and STORAGE OPERATIONS.

ACTIONS

----------NOTES----------
Separate Condition entry is allowed for each MPC.

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. MPC cavity vacuum drying pressure or demoisturizer exit gas temperature limit not met.	A.1 Perform an engineering evaluation to determine the quantity of moisture left in the MPC. AND	7 days
	A.2 Develop and initiate corrective actions necessary to return the MPC to compliance with Table 3-1.	30 days
B. MPC cavity vacuum drying acceptance criteria not met during allowable time.	B.1 Backfill the MPC cavity with helium to a pressure of at least 0.5 atm.	6 hours

CONDITION	REQUIRED ACTION	COMPLETION TIME
C. MPC helium backfill limit not met.	C.1 Perform an engineering evaluation to determine the impact of helium differential. AND C.2.1 Develop and initiate corrective actions necessary to return the MPC to an analyzed condition by adding helium to or removing helium from the MPC. OR C.2.2 Develop and initiate corrective actions necessary to demonstrate through analysis, using the models and methods from the HI-STORM FSAR, that all limits for cask components and contents will be met.	72 hours 14 days
D. MPC helium leak rate limit for vent and drain port cover plate welds not met.	D.1 Perform an engineering evaluation to determine the impact of increased helium leak rate on heat removal capability and offsite dose. AND D.2 Develop and initiate corrective actions necessary to return the MPC to compliance with SR 3.1.1.3.	24 hours 7 days

CONDITION	REQUIRED ACTION	COMPLETION TIME
E. Required Actions and associated Completion Times not met.	E.1 Remove all fuel assemblies from the SFSC.	30 days

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.1.1.1	Verify that the MPC cavity has been dried in accordance with the applicable limits in Table 3-1, within the specified vacuum drying time limits as applicable.	Once, prior to TRANSPORT OPERATIONS
SR 3.1.1.2	Verify MPC helium backfill quantity is within the limit specified in Table 3-2 for the applicable MPC model. Re-performance of this surveillance is not required upon successful completion of Action C.2.2.	Once, prior to TRANSPORT OPERATIONS
SR 3.1.1.3	Verify that the helium leak rate through the MPC vent and drain port confinement welds meets the leaktight criteria of ANSI N14.5-1997.	Once, prior to TRANSPORT OPERATIONS

3.1 SFSC INTEGRITY

3.1.2 SFSC Heat Removal System

LCO 3.1.2 The SFSC Heat Removal System shall be operable

----------NOTE----------
The SFSC Heat Removal System is operable when 50% or more of the inlet and outlet vent areas are unblocked and available for flow or when air temperature requirements are met.

APPLICABILITY: During STORAGE OPERATIONS.

ACTIONS
----------NOTE----------
Separate Condition entry allowed for each SFSC

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. SFSC Heat Removal System operable, but partially (<50%) blocked.	A.1 Remove blockage.	N/A
B. SFSC Heat Removal System inoperable.	B.1 Restore SFSC Heat Removal System to operable status.	8 hours

SURVEILLANCE REQUIREMENTS

CONDITION	REQUIRED ACTION	COMPLETION TIME
C. Required Action B.1 and associated Completion Time not met.	C.1 Measure SFSC dose rates in accordance with the Radiation Protection Program.	Immediately and once per 12 hours thereafter
	AND	
	C.2.1 Restore SFSC Heat Removal System to operable status.	16 hours
	OR	
	C.2.2 Transfer the MPC into a TRANSFER CASK.	16 hours

SURVEILLANCE		FREQUENCY
SR 3.1.2	Verify all VVM inlets and outlets are free of blockage from solid debris or floodwater.	16 hours
	OR	
	For VVMs with installed temperature monitoring equipment, verify that the difference between the average VVM air outlet temperature and ISFSI ambient temperature is ≤ 85°F for VVMs containing PWR MPCs and ≤ 93°F for VVMs containing BWR MPCs.	16 hours

3.1 SFSC INTEGRITY

3.1.3 MPC Cavity Reflooding

LCO 3.1.3 The MPC cavity pressure shall be < 100 psig

----------NOTE----------
The LCO is only applicable to wet UNLOADING OPERATIONS.

APPLICABILITY: UNLOADING OPERATIONS prior to and during re-flooding.

ACTIONS

----------NOTE----------
Separate Condition entry is allowed for each MPC.

CONDITION	REQUIRED ACTION	COMPLETION TIME
B. MPC cavity pressure not within limit.	A.1 Stop re-flooding operations until MPC cavity pressure is within limit. AND A.2 Ensure MPC vent port is not closed or blocked.	Immediately Immediately

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.1.3.1	Ensure via analysis or direct measurement that MPC cavity pressure is within limit.	Once, prior to MPC re-flooding operations. AND Once every 1 hour thereafter when using direct measurement.

3.1 SFSC INTEGRITY

3.1.4 Deleted

LCO 3.1.4 Deleted

3.1 SFSC INTEGRITY

3.1.5 Impressed Current Cathodic Protection System (ICCPS)

LCO 3.1.5 The ICCPS shall be maintained operative

APPLICABILITY: During STORAGE OPERATIONS for any ISFSI that uses an ICCPS for corrosion mitigation.

----------NOTE----------
Separate condition entry is allowed for each ICCPS at a particular ISFSI site.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
C. ICCPS inoperable after initial startup period.	A.1 Restore ICCPS to operable status OR A.2 Perform engineering evaluation to determine that the affected VVM's will maintain adequate integrity for at least 4 more years.	6 months 1 year
B. ICCPS 70% operable status not met.	B.1 Perform engineering evaluation to determine that the affected VVM's will maintain adequate integrity for at least 3 more years. OR B.2 Perform repairs necessary to re-establish integrity of the affected VVM's	1 year 3 years
C. Required Actions and associated Completion Times not met.	C.1 Transfer MPC's from affected VVM's to unaffected VVM's or other approved overpacks.	3 years

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.1.5.1	Verify the ICCPS is operable 1 year after installation of the first VVM and remains operable after initial startup. The ICCPS may be shutdown temporarily as necessary for power outages, repair or preventive maintenance and testing, or system modifications after which the system should be returned to operable status as soon as practicable. This surveillance requirement is suspended for one year after action A.2 has been met	Once within 1 year AND Every 1 month thereafter
SR 3.1.5.2	Verify the ICCPS has been operable for at least 70% of the time after initial startup. The verification shall not be performed prior to 8 years from the time of initial startup. If the integrity of the VVM has previously been re-established per ACTION B.2, then the initial startup period may be reset. This surveillance is no longer applicable upon initiation of ACTION C.1.	Once within 10 years AND Every 5 years thereafter

3.2 SFSC RADIATION PROTECTION.

3.2.1 Not Used.

LCO 3.2.1 Not Used.

3.2 SFSC RADIATION PROTECTION.

3.2.2 TRANSFER CASK Surface Contamination.

LCO 3.2.2 Removable contamination on the exterior surfaces of the TRANSFER CASK and accessible portions of the MPC shall each not exceed:

a. 1000 dpm/100 cm^2 from beta and gamma sources

b. 20 dpm/100 cm^2 from alpha sources.

APPLICABILITY: During TRANSPORT OPERATIONS.

ACTIONS

----------NOTE----------
Separate Condition entry is allowed for each TRANSFER CASK.

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. TRANSFER CASK or MPC removable surface contamination limits not met.	A.1 Restore removable surface contamination to within limits.	7 days

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.2.2.1	Verify that the removable contamination on the exterior surfaces of the TRANSFER CASK and accessible portions of the MPC containing fuel is within limits.	Once, prior to TRANSPORT OPERATIONS

3.2 SFSC RADIATION PROTECTION.

3.2.3 Not Used.

LCO 3.2.3 Not Used.

3.3 SFSC CRITICALITY CONTROL

3.3.1 Boron Concentration

LCO 3.3.1 As required by CoC Appendix B-100U, Table 2.1-2, the concentration of boron in the water in the MPC shall meet the following limits for the applicable MPC model and the most limiting fuel assembly array/class and classification to be stored in the MPC:

a. MPC-24 with one or more fuel assemblies having an initial enrichment greater than the value in Table 2.1-2 for no soluble boron credit and $\leq$ 5.0 wt% ^{235}U: $\geq$ 400 ppmb

b. MPC-24E with one or more fuel assemblies having an initial enrichment greater than the value in Table 2.1-2 for no soluble boron credit and $\leq$ 5.0 wt% ^{235}U: $\geq$ 300 ppmb

c. Not Used.

d. Not Used.

e. Not Used.

f. MPC-32: Minimum soluble boron concentration as required by the table below†.

Array/Class	All INTACT FUEL ASSEMBLIES	
	Maximum Initial Enrichment $\leq$ 4.1 wt% ^{235}U (ppmb)	Maximum Initial Enrichment 5.0 wt% ^{235}U (ppmb)
14x14A/B/C/D/E	1,300	1,900
15x15A/B/C/G	1,800	2,500
15x15D/E/F/H	1,900	2,600
16x16A/B/C	1,400	2,000
17x17A/B/C	1,900	2,600

† For maximum initial enrichments between 4.1 wt% and 5.0 wt% ^{235}U, the minimum soluble boron concentration may be determined by linear interpolation between the minimum soluble boron concentrations at 4.1 wt% and 5.0 wt%.

APPLICABILITY: During PWR fuel LOADING OPERATIONS with fuel and water in the MPC

AND

During PWR fuel UNLOADING OPERATIONS with fuel and water in the MPC.

ACTIONS

----------NOTE----------
Separate Condition entry is allowed for each MPC.

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. Boron concentration not within limit.	A.1 Suspend LOADING OPERATIONS or UNLOADING OPERATIONS. AND A.2 Suspend positive reactivity additions. AND A.3 Initiate action to restore boron concentration to within limit.	Immediately Immediately Immediately

SURVEILLANCE REQUIREMENTS

SURVEILLANCE	FREQUENCY
----------NOTE---------- This surveillance is only required to be performed if the MPC is submerged in water or if water is to be added to, or recirculated through the MPC. --- SR 3.3.1.1 Verify boron concentration is within the applicable limit using two independent measurements.	Once, within 4 hours prior to entering the Applicability of this LCO. AND Once per 48 hours thereafter.

Table 3-1
MPC Cavity Drying Limits for All MPC Types

Fuel Burnup (MWD/MTU)	**MPC Heat Load Q (kW)**	**Method of Moisture Removal (Notes 1 and 2)**
All Assemblies $\leq$ 45,000	$\leq$ 30	VDS or FHD
All Assemblies $\leq$ 45,000	> 30	FHD
One or more assemblies > 45,000	$\leq$ 36.9	FHD

Notes:

1. VDS means a vacuum drying system. The acceptance criterion when using a VDS is the MPC cavity pressure shall be $\leq$ 3 torr for $\geq$ 30 minutes.
2. FHD means a forced helium dehydration system. The acceptance criterion when using an FHD System is the gas temperature exiting the demoisturizer shall be $\leq$ 21°F for $\geq$ 30 minutes or the gas dew point exiting the MPC shall be $\leq$ 22.9°F for $\geq$ 30 minutes.
3. Vacuum drying of the MPC must be performed with the annular gap between the MPC and the HI-TRAC filled with water.

Table 3-2
MPC Helium Backfill Limits[1]

MPC MODEL	LIMIT
MPC-24/24E	
i. Cask Heat Load ≤ 27.77 kW (MPC-24) or ≤ 28.17 kW (MPC-24E)	0.1212 +/-10% g-moles/l OR ≥ 29.3 psig and ≤ 48.5 psig
ii. Cask Heat Load >27.77 kW (MPC-24) or > 28.17 kW (MPC-24E)	≥ 45.5 psig and ≤ 48.5 psig
MPC-32	
i. Cask Heat Load ≤ 28.74 kW	≥ 29.3 psig and ≤ 48.5 psig
ii. Cask Heat Load >28.74 kW	≥ 45.5 psig and ≤ 48.5 psig
MPC-68	
i. Cask Heat Load ≤ 28.19 kW	0.1218 +/-10% g-moles/l OR ≥ 29.3 psig and ≤ 48.5 psig
ii. Cask Heat Load > 28.19 kW	≥ 45.5 psig and ≤ 48.5 psig

[1] Helium used for backfill of MPC shall have a purity of ≥ 99.995%. Pressure range is at a reference temperature of 70°F

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5.0 ADMINISTRATIVE CONTROLS AND PROGRAMS

The following programs shall be established, implemented and maintained.

5.1 Not Used.

5.2 Not Used.

5.3 Not Used.

5.4 Radioactive Effluent Control Program

This program implements the requirements of 10 CFR 72.44(d).

a. The HI-STORM 100 Cask System does not create any radioactive materials or have any radioactive waste treatment systems. Therefore, specific operating procedures for the control of radioactive effluents are not required. Specification 3.1.1, Multi-Purpose Canister (MPC), provides assurance that there are not radioactive effluents from the SFSC.

b. This program includes an environmental monitoring program. Each general license user may incorporate SFSC operations into their environmental monitoring programs for 10 CFR Part 50 operations.

c. An annual report shall be submitted pursuant to 10 CFR 72.44(d)(3).

(continued)

5.5 Cask Transport Evaluation Program

This program provides a means for evaluating various transport configurations and transport route conditions to ensure that the design basis drop limits are met. For lifting of the loaded TRANSFER CASK using devices which are integral to a structure governed by 10 CFR Part 50 regulations, 10 CFR 50 requirements apply. This program is not applicable when the TRANSFER CASK is in the FUEL BUILDING or is being handled by a device providing support from underneath (i.e., on a rail car, heavy haul trailer, air pads, etc...) or is being handled by a device designed in accordance with the increased safety factors of ANSI N14.6 and having redundant drop protection.

Pursuant to 10 CFR 72.212, this program shall evaluate the site-specific transport route conditions.

a. For the TRANSFER CASK, the following requirements apply:

1. The lift height above the transport route surface(s) shall not exceed the limits in Table 5-1 except as provided for in Specification 5.5.a.2. Also, if applying the limits in Table 5-1, the program shall ensure that the transport route conditions (i.e., surface hardness and pad thickness) are equivalent to or less limiting than either Set A or Set B in HI-STORM FSAR Table 2.2.9.

2. The program may determine lift heights by analysis based on the site-specific conditions to ensure that the impact loading due to design basis drop events does not exceed 45 g’s at the top of the MPC fuel basket. These alternative analyses shall be commensurate with the drop analyses described in the Final Safety Analysis Report for the HI-STORM 100 Cask System. The program shall ensure that these alternative analyses are documented and controlled.

(continued)

5.5 Cask Transport Evaluation Program (continued)

3. The TRANSFER CASK, when loaded with spent fuel, may be lifted to any height necessary during TRANSPORT OPERATIONS provided the lifting device is designed in accordance with ANSI N14.6 and has redundant drop protection features.

4. The TRANSFER CASK and MPC, when loaded with spent fuel, may be lifted to those heights necessary to perform cask handling operations, including MPC TRANSFER, provided the lifts are made with structures and components operated, fabricated, tested, inspected, and maintained in accordance with the guidelines of NUREG-0612, “Control of Heavy Loads at Nuclear Power Plants”,as applicable, and has devices that prevent uncontrolled lowering of the load.”

Table 5-1

TRANSFER CASK Lifting Requirements

ITEM	ORIENTATION	LIFTING HEIGHT LIMIT (in.)
TRANSFER CASK	Horizontal	42 (Notes 1 and 2)
TRANSFER CASK	Vertical	None Established (Note 2)

Notes: 1. To be measured from the lowest point on the TRANSFER CASK (i.e., the bottom edge of the cask/lid assemblage)

2. See Technical Specification 5.5.a.3 and 4

(continued)

5.6 Not Used.

(continued)

5.7 Radiation Protection Program

5.7.1 Each cask user shall ensure that the Part 50 radiation protection program appropriately addresses dry storage cask loading and unloading, as well as ISFSI operations, including transport of the loaded TRANSFER CASK outside of facilities governed by 10 CFR Part 50. The radiation protection program shall include appropriate controls for direct radiation and contamination, ensuring compliance with applicable regulations, and implementing actions to maintain personnel occupational exposures As Low As Reasonably Achievable (ALARA). The actions and criteria to be included in the program are provided below.

5.7.2 As part of its evaluation pursuant to 10 CFR 72.212(b)(2)(i)(C), the licensee shall perform an analysis to confirm that the dose limits of 10 CFR 72.104(a) will be satisfied under the actual site conditions and ISFSI configuration, considering the planned number of casks to be deployed and the cask contents.

5.7.3 Based on the analysis performed pursuant to Section 5.7.2, the licensee shall establish individual cask surface dose rate limits for the HI-TRAC TRANSFER CASK and the HI-STORM VVM to be used at the site. Total (neutron plus gamma) dose rate limits shall be established at the following locations:

a. The top of the TRANSFER CASK and the VVM.
b. The side of the TRANSFER CASK
c. The outlet vent on the VVM

5.7.4 Notwithstanding the limits established in Section 5.7.3, the measured dose rates on a loaded VVM shall not exceed 30 mrem/hr (gamma+neutron) on the top of the VVM.

5.7.5 The licensee shall measure the TRANSFER CASK and VVM surface neutron and gamma dose rates as described in Section 5.7.8 for comparison against the limits established in Section 5.7.3 or Section 5.7.4, whichever are lower.

(continued)

5.7 Radiation Protection Program (cont'd)

5.7.6 If the measured surface dose rates exceed the lower of the two limits established in Section 5.7.3 or Section 5.7.4, the licensee shall:

a. Administratively verify that the correct contents were loaded in the correct fuel storage cell locations.
b. Perform a written evaluation to verify whether a VVM at the ISFSI containing the as-loaded MPC will cause the dose limits of 10 CFR 72.104 to be exceeded.
c. Perform a written evaluation within 30 days to determine why the surface dose rate limits were exceeded.

5.7.7 If the evaluation performed pursuant to Section 5.7.6 shows that the dose limits of 10 CFR 72.104 will be exceeded, the MPC shall not be placed into storage or the MPC shall be removed from storage until appropriate corrective action is taken to ensure the dose limits are not exceeded.

5.7.8 TRANSFER CASK and VVM surface dose rates shall be measured at approximately the following locations:

a. A minimum of four (4) dose rate measurements shall be taken on the side of the TRANSFER CASK approximately at the cask mid-height plane. The measurement locations shall be approximately 90 degrees apart around the circumference of the cask. Dose rates shall be measured between the radial ribs of the water jacket.

b. A minimum of four (4) TRANSFER CASK top lid dose rates shall be measured at locations approximately half way between the edge of the hole in the top lid and the outer edge of the top lid, 90 degrees apart around the circumference of the top lid.

c. A minimum of four (4) dose rate measurements shall be taken on the top of the VVM. These measurements shall be taken approximately 90 degrees apart around the circumference of the lid, approximately 18 inches radially inward from the edge of the lid.

(continued)

5.7 Radiation Protection Program (cont'd)

d. A minimum of four (4) dose rate measurements shall be taken adjacent to the outlet vent screen of the VVM, approximately 90 degrees apart.

5.7.9 The "Radiation Protection Space" (RPS) is a prismatic subgrade buffer zone surrounding a loaded VVM. The RPS boundary is located at a minimum of fourteen (14) feet from the centerline of a loaded VVM located on the periphery of an operating ISFSI, and at a minimum of twenty-one (21) feet from the centerline of a loaded VVM not located on the periphery. The RPS boundary shall not be encroached upon during any site construction activity. The jurisdictional boundary of the RPS extends from the top surface of the foundation pad to the top of the VVM interface pad and the top surface pad. The ISFSI design shall ensure that there is no significant loss of shielding in the RPS due to a credible accident or an extreme environment event during construction involving excavation adjacent to the RPS boundary.