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June 7, 2022
E-60969

U. S. Nuclear Regulatory Commission
Attn: Document Control Desk
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Subject: Application for Amendment 3 to NUHOMS® EOS Certificate of Compliance No. 1042, Revision 6 (Docket 72-1042, CAC No. 001028, EPID: L-2021-LLA-0055) –Revised Responses to Request for Additional Information (RAIs 9-1 and 9-2)

References:

[1] Letter E-60459 from Prakash Narayanan, Application for Amendment 3 to NUHOMS® EOS Certificate of Compliance No. 1042, Revision 5 (Docket 72-1042, CAC No. 001028, EPID: L-2021-LLA-0055) – Response to Request for Additional Information (New Scope) and Revised Responses to Request for Additional Information, dated February 25, 2022

[2] Letter from Christian Jacobs to Prakash Narayanan, "TN Americas LLC Application for Certificate of Compliance No. 1042, Amendment No. 3, to NUHOMS® EOS System (Docket No. 72-1042, CAC No. 001028, EPID: L-2021-LLA-0055) – Request for Additional Information (New Scope)," dated January 24, 2022

[3] Letter E-59819 from Prakash Narayanan, Application for Amendment 3 to NUHOMS® EOS Certificate of Compliance No. 1042, Revision 3a (Docket 72-1042, CAC No. 001028, EPID: L-2021-LLA-0055) – Amendment Scope Change, dated October 22, 2021

[4] Letter E-58329 from Prakash Narayanan, Application for Amendment 3 to NUHOMS® EOS Certificate of Compliance No. 1042, Revision 0 (Docket 72-1042), dated March 31, 2021

This submittal is a supplement to Reference [1] and provides revised responses to specific RAI items. As a follow-up to Reference [1], the NRC and TN held a conference call on April 20, 2022, for the purpose of discussing clarification to RAIs 9-1 and 9-2.

Enclosure 1 herein provides the revised RAI responses. Each RAI response has a section stating the impact of the response on the application, both Technical Specifications (TS) and updated final safety analysis report (UFSAR), indicating which sections, tables, etc., have been changed.

Enclosure 2 provides a listing of CoC 1042 Amendment 3 TS changes resulting from the revised RAIs. Enclosure 3 provides a listing of changed TS and UFSAR pages resulting from the revised RAIs.

Enclosure 4 provides the TS changed pages, denoted as Revision 6 with changes indicated by italicized text and revision bars. The changes are further annotated with gray shading and an indication of the revised RAI associated with the changes.

Enclosure 5 provides the UFSAR changed pages associated with this Revision 6 to the application for Amendment 3. The changed pages include a footer annotated as “72-1042 Amendment 3, Revision 6, June 2022” with changes indicated by italicized text and revision bars. The changes associated with the revised RAI response are further demarcated with gray shading and an indication of the revised RAI associated with the changes.

Should the NRC staff require additional information to support review of this application, please do not hesitate to contact Mr. Glenn Mathues at 410-910-6538, or by email at Glenn.Mathues@orano.group.

Sincerely,

A. Prakash

Prakash Narayanan
Chief Technical Officer

cc: Chris Jacobs (NRC), Senior Project Manager, Storage and Transportation Licensing Branch Division of Fuel Management

Enclosures:

1. RAIs and Responses
2. List of New CoC 1042 Amendment 3, Revision 6 Technical Specifications Changes and Justifications
3. List of TS and UFSAR Pages Involved in CoC 1042 Amendment 3, Revision 6
4. CoC 1042 Proposed Amendment 3, Revision 6 Technical Specifications Changed Pages
5. CoC 1042 Amendment 3, Revision 6 UFSAR Changed Pages

RAI 9-1:

Describe how winds that are greater than 44 mph, which occur independent of tornados and thunderstorms, are addressed in the Technical Specification 1.1 and in the application as related to the definition of a SAFE CONDITION AND FORECAST.

Based on the staff's review of the warnings, watches, or advisories from the National Oceanic and Atmospheric Administration's National Weather Service, there are other external events that result in winds greater than 44 miles per hour (mph). Those warnings and watches include blizzard, high wind, hurricane, and tropical storm. A blizzard is a severe snowstorm characterized by strong sustained winds of at least 35 mph. High winds can be 40 mph or greater that last for one hour or longer or include wind gusts that are 58 mph or greater regardless of duration and observed on land. A Category 1 hurricane, the lowest hurricane category, can have sustained winds from 74 to 95 mph. A tropical storm can have sustained winds from 39 to 74 mph. In addition to the above watches and warnings, a wind advisory may be issued for sustained winds of 31 to 39 mph for an hour or more and/or wind gusts of 46 to 57 mph for any duration.

This information in necessary to determine compliance with 10 CFR 72.236(l).

***Revised* Response to RAI 9-1:**

TN agrees that winds with speeds greater than the operating limit of 44 mph can occur independent of tornado and severe thunderstorm conditions. The proposed change to Technical Specification (TS) 1.1 defines a SAFE CONDITION AND FORECAST in terms of the absence of a tornado warning or watch, or a severe thunderstorm advisory where the thunderstorm could be capable of spawning a tornado event. The proposed change incorporates administrative controls in TS 5.2.1 to check the weather forecast prior to lifting the loaded transfer cask/dry shielded canister (TC/DSC) above the lift height restriction of the TS.

In addition, transfer procedures conservatively require an initial check of the weather forecast prior to exiting the tornado protected structure where prior LOADING OPERATIONS occurred. This is intended to avoid the potential for a tornado accident to occur during short duration TRANSFER OPERATIONS involving the MATRIX Loading Crane (MX-LC). More specifically, these are accident conditions limited to tornado winds and tornado generated missiles, where such a tornado event is quite predictable in the short term via weather forecasting.

As defined in Section 4134 of ASME NOG-1, the Operating Wind is the maximum wind load under which the crane is permitted to operate. For the MX-LC, that Operating Wind limit is 44 mph as established in the associated design documents. In the associated structural calculations, the MX-LC is shown to be structurally adequate to safely operate under these conditions. Therefore, the Operating Wind represents a normal design condition.

A trained and certified crane operator is responsible for monitoring wind conditions during MX-LC operations. This is achieved by using a wind speed instrument (i.e., anemometer) located at the ISFSI that is capable of measuring sustained winds and peak wind gusts. In the event that the wind speed (either sustained wind or wind gusts) approaches the 44 mph operating limit, the crane operator suspends operations, lowers the MX-LC, places it in a safe parked position and secures the load (i.e., TC/DSC on transfer skid), consistent with ASME NOG-1 requirements. The use of an anemometer to monitor the wind speed and suspend crane operations prior to

exceeding the Operating Wind limit is typical for mobile cranes and outdoor fixed cranes, and consistent with Crane Manufacturer's Association of America (CMAA) operating protocol. Wind speeds exceeding the Operating Wind limit of 44 mph represent an off-normal design condition.

The proposed TS requirement to confirm a SAFE CONDITION AND FORECAST is limited to the accident condition only, in order to avoid TRANSFER OPERATIONS during impending tornado conditions. Restrictions on MX-LC operations during off-normal wind conditions are addressed through procedural controls that credit crane operator action to suspend MX-LC operations in the event the Operating Wind limit of 44 mph is approached where such procedural controls are not tied to the weather forecast, but rather require that the wind speed be monitored in real time. This approach is justified since an exceedance of the Operating Wind limit would not cause significant damage to the MX-LC due to inherent margins available in the structural design, whereas the accident loading due to tornado winds and/or tornado generated missile strikes could cause substantial damage to the MX-LC thereby hindering recovery operations from such an event. Therefore, the administrative controls proposed in the TS are more restrictive than those for wind conditions that exceed the Operating Wind limit.

In conclusion, TN believes that the requirements of 10 CFR 72.236(l) are satisfied, in that the spent fuel storage cask and its systems important to safety have been demonstrated to reasonably maintain confinement of radioactive material under normal, off-normal, and credible accident conditions.

In a follow up clarification call with the NRC, the proposed definition of SAFE CONDITION AND FORECAST has been revised to incorporate other forecasted weather conditions where the wind gust is expected to exceed the operating wind limit of the ISFSI equipment. UFSAR Sections A.2.3.1, A.2.4.2.4, and A.12.3.1 have been revised accordingly.

Based on recent industry discussions with the NRC, and the issuance of EGM 22-001, TN proposes to move the administrative controls involving a SAFE CONDITION AND FORECAST from the TS to the UFSAR. Therefore, UFSAR Sections A.2.3.1, A.2.4.2.4, and A.12.3.1 have been revised to incorporate the revised definition of safe condition and forecast. UFSAR Sections A.9.1 and A.9.2 have been revised to point to UFSAR Section A.2.4.2.4 for the definition of a safe condition and forecast. TS Section 1.1 has been revised to remove the definition of SAFE CONDITION AND FORECAST, and TS Section 5.2.1 has been revised to remove the discussion with respect to the weather check.

Impact:

Technical Specifications Sections 1.1 and 5.2.1 have been revised as described in this revised response.

UFSAR Sections A.2.3.1, A.2.4.2.4, A.9.1, A.9.2, and A.12.3.1 have been revised as described in this revised response.

RAI 9-2:
Provide a basis for the updated final safety analysis report (UFSAR) eight-hour limit. Include a description of compensatory actions to cease transient operations when impending tornado conditions or forecasted winds are expected and/or exceed 44 mph to include mitigating actions related to safely securing the transfer cask in the event of transfer equipment failure. Further, provide a description of notification meteorological monitoring criterion prior to the start of the ISFSI transient operations (e.g., notification of control room, monitoring of weather during ISFSI transient operations, and site walkdowns to identify and secure any potential hazards).
UFSAR Section A.2.4.2.4, MX-LC Design Criteria, allows the use of administrative controls based on a conservative time frame of eight hours for completing operational tasks associated with insertion of a dry shielded canister into the HSM-MX. It is unclear as to the basis for eight hours. UFSAR Section 2.4.2.4 currently does not include a description of notification meteorological monitoring criterion prior to the start of the ISFSI transient operations to preclude short term operations during periods of adverse weather or during periods when adverse weather is predicted.
This information in necessary to determine compliance with 10 CFR 72.236(l).

***Revised* Response to RAI 9-2:**

The eight-hour time frame associated with the safe condition and forecast is described in the proposed change to UFSAR Section A.2.4.2.4, MX-LC Design Criteria. The proposed change states that the total duration to complete the tasks necessary to lift the loaded transfer cask (TC) with the MATRIX Loading Crane (MX-LC), dock the TC to the NUHOMS® MATRIX (HSM-MX), and insert the dry shielded canister (DSC) into the HSM-MX is conservatively estimated at eight hours. Recent activities using the MX-LC to load the HSM-MX have confirmed the conservative nature of this duration.

A defense-in-depth approach is provided for any compensatory actions needed when impending tornado conditions exist. Initially, as described in the Response to RAI 9-1, a safe condition and forecast is confirmed in the loading procedure prior to draining the TC/DSC annulus and entering TRANSFER OPERATIONS while the TC is still in the tornado protected structure where prior LOADING OPERATIONS occurred. Subsequent to exiting the tornado protected structure and transferring the loaded TC/DSC from the transfer trailer to the MX-LC, a safe condition and forecast is once again confirmed prior to lifting the TC/DSC above the lift height restriction of Technical Specification *(TS) 5.2.1*. In the highly unlikely event the weather deteriorates from a safe condition and forecast to impending tornado conditions during the eight-hour duration when the MX-LC is in use, operations would then be reversed to lower the crane to below the TS lift height restriction, placing it in a safe parked position with the load secured. However, the intent of the weather check is to never be vulnerable to such a situation, based on a highly accurate short duration forecast for the absence of tornado or severe thunderstorm conditions.

Similarly, while the MX-LC is in use, if winds approach the Operating Wind limit of 44 mph as indicated by the crane operator's wind speed instrument, the MX-LC would be secured, meaning that the crane would be lowered below the TS lift height restriction, and placed in a safe parked position with the load secured, consistent with Crane Manufacturer's Association of America (CMAA) operating protocol.

In the event of an operational failure of the MX-LC equipment (e.g., inability to lower the crane), compensatory measures are provided in the transfer procedure to lower the load via alternate means. Although the MX-LC is designed as single-failure-proof, that does not preclude the possibility of an operational/functional failure (not gross structural failure) of the lifting equipment. The lifting equipment is qualified to fail safe (i.e., stop movement and continue to hold the load), but could lose its operational function to raise or lower the load. In the event the lifting equipment is unable to be repaired in the short duration, provisions are available in a recovery procedure to safely lower the load using contingency rigging hardware, which has the same single-failure-proof design requirements and safety classification as the MX-LC components that it replaces.

Regarding the meteorological monitoring process, as described above, prior to exiting the tornado protected structure, an initial weather check confirms a safe condition and forecast. The control room is notified at the start of TRANSFER OPERATIONS and prior to proceeding to the independent spent fuel storage installation (ISFSI). Both the weather forecast and wind speed are monitored for the duration of outdoor TRANSFER OPERATIONS until the DSC is inserted into the HSM-MX and the door installed. Such meteorological monitoring is coordinated with site operations procedures for tornado conditions, severe thunderstorms, and high winds. Prior to lifting the TC/DSC above the lift height restriction of TS 5.2.1, a safe condition and forecast is once again confirmed. The proposed change to UFSAR Chapter A.9 incorporates appropriate instructions to perform the weather check per *UFSAR Section A.2.4.2.4.* Additionally, a walkdown of the haul path and ISFSI apron is required to be performed to identify any potential hazards as a procedural prerequisite to the initiation of TRANSFER OPERATIONS.

In conclusion, TN believes that the requirements of 10 CFR 72.236(l) are satisfied, in that the spent fuel storage cask and its systems important-to-safety have been demonstrated to reasonably maintain confinement of radioactive material under normal, off-normal, and credible accident conditions.

Based on a follow up clarification call with the NRC, UFSAR Section A.2.4.2.4 has been revised to incorporate the mitigating actions described above.

Impact:

UFSAR Section A.2.4.2.4 has been revised as described in this revised response.

List of New CoC 1042 Amendment 3, Revision 6 Technical Specifications
Changes and Justifications

Changed Technical Specifications (TS) Area and Page Number	Justification
Table of Contents, List of Tables, and List of Figures	Updated
Section 1.1, Page 1-3	As described in the revised response to RAI 9-1, the definition of SAFE CONDITION AND FORECAST has been removed.
Section 5.2.1, Page 5-7	As described in the revised response to RAI 9-1, Section 5.2.1 was revised to remove the discussion with respect to the weather check.

List of TS and UFSAR Pages
Involved in CoC 1042 Amendment 3, Revision 6

Technical Specifications Pages
1-3
5-7

UFSAR Pages
A.2-5
A.2-10
A.2-11
A.9-2
A.9-6
A.12-6

Enclosure 4 to E-60969

CoC 1042 Proposed Amendment 3, Revision 6
Technical Specifications Changed Pages

1.1 Definitions (continued)

HORIZONTAL STORAGE MODULE (HSM)	An HSM is a reinforced concrete structure for storage of a loaded DSC at a spent fuel storage installation. Where the term "HSM" is used without distinction, this term shall apply to both the EOS-HSM and HSM-MX. The term EOS-HSM refers to the base unit for storage of a single DSC as a single piece (EOS-HSM) or as a split base (EOS-HSMS). The term MATRIX (HSM-MX) refers to the two-tiered staggered structure for storage of the DSCs.
INDEPENDENT SPENT FUEL STORAGE INSTALLATION (ISFSI)	The facility within a perimeter fence licensed for storage of spent fuel within HSMs.
INTACT FUEL	Fuel assembly with no known or suspected cladding defects in excess of pinhole leaks or hairline cracks, and with no missing rods.
LOADING OPERATIONS	LOADING OPERATIONS include all licensed activities on a DSC in a TC while it is being loaded with fuel assemblies. LOADING OPERATIONS begin when the first fuel assembly is placed in the DSC and end when the TC is ready for TRANSFER OPERATIONS (i.e., when the cask is in a horizontal position on the transfer trailer.) LOADING OPERATIONS do not include DSC transfer between the TC and the HSM.
LOW-ENRICHED OUTLIER FUEL (LEOF)	LOW-ENRICHED OUTLIER FUEL is PWR and BWR fuel with enrichments below the minimum enrichment specified in Table 7A and Table 18, respectively.
RECONSTITUTED FUEL ASSEMBLY	A RECONSTITUTED FUEL ASSEMBLY is a fuel assembly where one or more fuel rods are replaced by low enriched uranium or natural uranium fuel rods or non-fuel rods.

(continued)

All Indicated Changes are in response to Revised RAI 9-1

5.0 ADMINISTRATIVE CONTROLS (continued)

iv. If measurements or other evidence indicate that the HSM-MX concrete temperatures have exceeded the concrete accident temperature limit of 500 °F for more than 32 hours, the user shall perform an analysis and/or tests of the concrete in accordance with TS 5.3. The user shall demonstrate that the structural strength of the HSM-MX has an adequate margin of safety and take appropriate actions to return the HSM-MX to normal operating conditions.

v. If measurements or other evidence indicate that off-normal or accident temperature limits for fuel cladding have been exceeded, verify that canister confinement is maintained and assess analytically the condition of the fuel. Additionally, within 30 days, take appropriate actions to restore the spent fuel to a safe configuration.

5.2 Lifting Controls

5.2.1 TC/DSC Lifting Height and Temperature Limits

The requirements of 10 CFR 72 apply to TC/DSC lifting/handling height limits outside the FUEL BUILDING. The requirements of 10 CFR Part 50 apply to TC/DSC lifting/handling height limits inside the FUEL BUILDING. Confirm the surface temperature of the TC before TRANSFER OPERATIONS of the loaded TC/DSC.

The lifting height of a loaded TC/ DSC is limited as a function of low temperature and the type of lifting/handling device, as follows:

- No lifts or handling of the TC/DSC at any height are permissible at TC surface temperatures below 0 °F
- The maximum lift height of the TC/DSC shall be 65 inches for the EOS-DSCs or 80 inches for the 61BTH Type 2 DSC if the surface temperature of the TC is above 0 °F and a non-single-failure-proof lifting/handling device is used.
- No lift height restriction is imposed on the TC/DSC if the TC 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 TC/DSC is in a horizontal orientation on the transfer trailer. The requirements of 10 CFR Part 50 apply when the TC/DSC is being lifted/handled using the cask handling crane/hoist. (This distinction is valid only with respect to lifting/handling height limits.)

5.2.2 Cask Drop

<u>Inspection Requirement</u>

The TC will be inspected for damage and the DSC will be evaluated after any TC with a loaded DSC side drop of 15 inches or greater.

(continued)

All Indicated Changes are in response to Revised RAI 9-1

Enclosure 5 to E-60969

CoC 1042 Amendment 3, Revision 6
UFSAR Changed Pages

A.2.3 Design Criteria for Environmental Conditions and Natural Phenomena

The HSM-MX ITS SSCs described in Section A.2.1 are designed consistent with the 10 CFR Part 72 [A.2-6] §122(b) requirement for protection against environmental conditions and natural phenomena. The criterion used in the design of the NUHOMS® EOS System ensures that exposure to credible site hazards does not impair their safety functions.

A.2.3.1 Tornado Wind and Tornado Missiles for HSM-MX

The HSM-MX *is* designed to safely withstand 10 CFR 72.122 (b)(2) tornado missiles. The tornado characteristics, as specified in NRC Regulatory Guide (RG) 1.76, Revision 1 [A.2-8], are used to qualify the HSM-MX. The missiles spectrum of NUREG-0800, Revision 3, Section 3.5.1.4 [A.2-10] with missile velocity for Region I is used to qualify the HSM-MX.

Extreme wind effects are much less severe than the specified design basis tornado (DBT) wind forces. The design basis extreme wind for the HSM-MX is calculated per [A.2-10].

The MX-LC is specified per ASME NOG-1 [A.2-7]*, which prohibits the use of a Type I gantry crane under extreme weather conditions (i.e., tornado wind and missile conditions, and high winds) and imposes administrative controls to place the crane in a secured position in advance of impending extreme weather conditions involving wind gusts that are expected to exceed the operating wind limit of the ISFSI equipment. Therefore, the MX-LC need only be designed for the operating wind speed of 44 mph. This is consistent with the definition of a safe condition and forecast, defined in Section A.2.4.2.4, which requires that a safe condition and forecast be verified for the lift height restrictions of a loaded TC/DSC.*

A.2.3.1.1 Tornado Wind Design Parameters

No change to Section 2.3.1.1.

A.2.3.1.2 Determination of Forces on Structures

No change to Section 2.3.1.2.

A.2.3.1.3 Tornado Missiles

No change to Section 2.3.1.3.

A.2.3.2 Tornado Wind and Tornado Missiles for EOS-TC

No change to Section 2.3.2.

A.2.4.2.4 MX-LC Design Criteria

The MX-LC is designed in accordance with the applicable portions of ASME NOG-1 [A.2-7], as a Type 1 gantry style crane. The MX-LC is engineered to provide *H*igh *I*ntegrity *H*andling (HIH) of the load, defined as a lifting/handling operation, wherein the risk of an uncontrolled lowering of the heavy load is considered non-credible. Demonstration of HIH of the MX-LC occurs when designed for "single-failure-proof" lifting operations per NUREG-0612 [A.2-9], maintaining the supported loads in a safe configuration during design basis events (e.g., seismic). Therefore, design requirements from ASME NOG-1 for Type 1 loading equipment are specified with an additional single failure proof handling capability. MX-LC single-failure-proof handling capability is achieved by ensuring that the applicable design factor is 200% of that required by ASME NOG-1 (i.e., NUREG-0612 application). Alternatively, other load carrying members may be designed with redundant devices to meet the single failure proof handling capability. Therefore, MX-LC HIH may be achieved by having either MX-LC subcomponent SSCs that comply with ASME NOG-1 stress limits plus the 200% NUREG-0612 design factor or with other MX-LC subcomponent SSCs having redundant safety basis protection features. 72.48

ASME NOG-1 prohibits the use of a Type I gantry crane under extreme weather conditions (i.e., tornado wind and missile conditions, and high winds), and imposes administrative controls to place the crane in a secured position in advance of impending extreme weather conditions involving wind gusts that are expected to exceed the operating wind limit of the ISFSI equipment. This is consistent with the definition of a safe condition and forecast, which requires that a safe condition and forecast be verified for the unrestricted lift height of a loaded TC/DSC.*

Use of such administrative controls is justified based on the time frame for completing the tasks necessary to lift the loaded TC with the MX-LC, dock the TC to the HSM-MX, and insert the DSC into the HSM-MX, where the total duration is conservatively estimated at eight hours.

**A safe condition and forecast is considered to be the absence of: Tornado and Severe Thunderstorm Watches, Tornado and Severe Thunderstorm Warnings, and Hazardous Weather Outlook indicating a moderate to high risk of severe thunderstorms for the current date (Day One at the National Oceanic and Atmospheric Administration (NOAA) website), or other forecasted weather conditions where the wind gust is expected to exceed the operating wind limit of the ISFSI equipment..*

All Indicated Changes are in response to Revised RAI 9-1

RAI 9-1

Weather forecasts will be accessed from the nearest NOAA Weather Forecast Office proximate to the site prior to each loading/unloading evolution. Administrative controls triggered by the presence of such severe weather forecasts ensure avoidance of atmospheric conditions that are favorable for the development of severe thunderstorms capable of producing tornados within the specified period of time. Therefore, the risk of an unexpected tornado within eight hours of the time that no severe weather is predicted is extremely remote. Additionally, the risk of unexpected high winds within eight hours of the time that no high winds are predicted is very unlikely.

A defense-in-depth approach is provided for any compensatory actions needed when impending tornado conditions or wind gusts exceeding the operating wind limit of the ISFSI equipment exist. Initially, a safe condition and forecast is confirmed in the loading procedure prior to draining the TC/DSC annulus and entering transfer operations while the TC is still in the tornado/wind protected structure where prior loading operations occurred. Subsequent to exiting the tornado/wind protected structure and transferring the loaded TC/DSC from the transfer trailer to the MX-LC, a safe condition and forecast is once again confirmed per procedure prior to lifting the TC/DSC above the lift height restriction of Technical Specification (TS) 5.2.1. In the highly unlikely event, the weather deteriorates from a safe condition and forecast to impending tornado/high wind conditions during the eight-hour duration when the MX-LC is in use, operations would then be reversed to lower the crane to below the TS lift height restriction, placing it in a safe parked position with the load secured. However, the intent of the weather check is to never be vulnerable to such a situation, based on a highly accurate short duration forecast for the absence of tornado, severe thunderstorm conditions or wind gusts exceeding the operating wind limit of the ISFSI equipment.

Similarly, while the MX-LC is in use, if wind gusts approach the operating wind limit of 44 mph as indicated by the crane operator's wind speed instrument, the MX-LC would be secured, meaning that the crane would be lowered below the TS lift height restriction, and placed in a safe parked position with the load secured.

Regarding the meteorological monitoring process, as described above, prior to exiting the tornado/wind protected structure, an initial weather check confirms a safe condition and forecast. The plant's control room is notified at the start of transfer operations and prior to proceeding to the ISFSI. Both the weather forecast and wind gust are monitored for the duration of outdoor transfer operations until the DSC is inserted into the HSM-MX. Such meteorological monitoring is coordinated with site operations procedures for tornado conditions, severe thunderstorms, and high winds.

RAI 9-2

A.9.1 Procedures for Loading the DSC and Transfer to the HSM-MX

The following steps describe the recommended operating procedures for HSM-MX system. A pictorial representation of key phases of this process is provided in Figure A.9-1.

A.9.1.1 TC and DSC Preparation

No change. See Section 9.1.1.

A.9.1.2 DSC Fuel Loading

No change. See Section 9.1.2.

A.9.1.3 DSC Drying and Backfilling

No change. See Section 9.1.3.

A.9.1.4 DSC Sealing Operations

No change. See Section 9.1.4.

A.9.1.5 TC Downending and Transfer to ISFSI

No change. See Section 9.1.5.

A.9.1.6 DSC Transfer to the HSM-MX

CAUTION: The insides of empty compartments have the potential for high dose rates due to adjacent loaded compartments. Proper as low as reasonably achievable (ALARA) practices should be followed for operations inside these compartments and in the areas outside these compartments whenever the door from the empty compartment has been removed.

1. MX-LC Rails are installed, aligned and verified on the pad for the loading campaign. Alignment is verified to the specifically designated features on the face of HSM-MX.

CAUTION: Prior to using the MX-LC to lift the loaded TC above the applicable lift height restriction of Technical Specification (TS) 5.2.1 [A.9-5], verify that the requirements of a safe condition and forecast, as defined in Section A.2.4.2.4, are satisfied regarding local weather. If, during operations with the MX-LC, the weather deteriorates from a safe condition and forecast, place the MX-LC in a secured position with the loaded TC at a height not to exceed the applicable lift height restriction of TS 5.2.1 [A.9-5].

2. Prior to transporting the TC to the ISFSI, remove the HSM-MX door, inspect the compartment of the HSM-MX, removing any debris and ready the HSM-MX to receive a DSC. The doors on adjacent compartments should remain in place.

A.9.2 Procedures for Unloading the DSC

The following section outlines the procedures for retrieving the DSC from the HSM-MX. The procedures for removing the FAs from the DSC are the same as described in Section 9.2.

A.9.2.1 DSC Retrieval from the HSM-MX

1. Ready the TC, transfer trailer, loading crane, and skid for service. Fill the TC liquid neutron shield and remove the top cover plate from the TC. Transport the trailer into the ISFSI.

CAUTION: Confirm a functional test of the air circulation system, including the blowers, generators, and power cords, etc. was satisfactorily performed within 7 days prior to commencing Transfer Operations, if required per Section 3.1.3 of the Technical Specifications [A.9-5]. 72.48

Note: Verify that a TC spacer of appropriate height is placed inside the TC to provide the correct airflow and interface at the top of the TC during cutting and unloading operations for DSCs that are shorter than the TC cavity length.

2. MATRIX MX-LC rails are installed, aligned and verified on the pad for the unloading campaign. Alignment is verified to the specifically designated features on the face of HSM-MX.

CAUTION: Prior to using the MX-LC to lift the loaded TC above the applicable lift height restriction of TS 5.2.1 [A.9-5], verify that the requirements of a safe condition and forecast, as defined in Section A.2.4.2.4, are satisfied regarding local weather. If, during operations with the MX-LC, the weather deteriorates from a safe condition and forecast, place the MX-LC in a secured position with the loaded TC at a height not to exceed the applicable lift height restriction of TS 5.2.1 [A.9-5].

3. Move the transfer trailer inside the MX-LC "home" position between the skid and the MX-LC grappling mechanism.

4. Use the MX-LC grappling mechanism to capture the skid along with TC, disengage the skid positioning system, move the skid up vertically to clear it from the transfer trailer, then move the transfer trailer from the MX-LC.

5. Install the ram cylinder assembly.

CAUTION: The insides of *loaded* compartments have the potential for high dose rates. Proper ALARA practices should be followed for operations in the areas outside these compartments whenever the MX-RRT operations are being performed. 72.48

All Indicated Changes are in response to Revised RAI 9-1

Once the EOS-TC is loaded onto the transfer skid/trailer and secured, it is pulled to the HSM-MX site by a tractor vehicle. A predetermined route is chosen to minimize the potential hazards that could occur during transfer. This movement is performed at very low speeds. System operating procedures and technical specification limits defining the safeguards to be provided ensure that the system design margins are not compromised. As a result, it is highly unlikely that any plausible incidents leading to an EOS-TC drop accident could occur. At the ISFSI site, the transfer skid/trailer is used in conjunction with the MATRIX loading crane (MX-LC). The MX-LC is used to assist in loading the DSC into the HSM. The MX-LC is designed, fabricated, installed, tested, inspected and qualified in accordance with *the applicable portions of* ASME NOG-1, as a Type I gantry type of crane, as per the guidance provided in NUREG-0612 [A.12-4]. *ASME NOG-1 [A.12-9] prohibits the use of a Type I gantry crane under extreme weather conditions (i.e., tornado wind and missile conditions, and high winds), and imposes administrative controls to place the crane in a secured position in advance of impending extreme weather conditions involving wind gusts that are expected to exceed the operating wind limit of the ISFSI equipment. This is consistent with the definition of a safe condition and forecast, defined in Section A.2.4.2.4, which requires that a safe condition and forecast be verified for the lift height restrictions of a loaded TC/DSC.*

The transfer skid/trailer is backed up to, and aligned with, the HSM-MX using transfer equipment. The EOS-TC/MX-LC is docked with, and secured to, the HSM-MX access opening. The MX-RRT rollers are extended into HSM-MX through front wall slots for the MX-RRT and secured. The loaded DSC is transferred to or from the HSM-MX using a transfer equipment. The MX-RRT is then lowered to place the DSC on the front and rear DSC supports in the HSM-MX. As a result, for a loaded EOS-TC drop accident to occur during these operations is considered non credible.

Lifts of the EOS-TC loaded with the dry storage canister are made within the existing heavy loads requirements and procedures of the licensed nuclear power plant. The EOS-TC design meets requirements of NUREG-0612 [A.12-4] and American National Standards Institute (ANSI) N14.6 [A.12-4].

The EOS-TC is transferred to the ISFSI in a horizontal configuration. Therefore, the only drop accident evaluated during storage or transfer operations is a side drop or a corner drop.

The EOS-TC and DSC are evaluated for a postulated side and corner drops to demonstrate structural integrity during transfer and plant handling.

<u>Accident Analysis</u>

No change to accident analysis in Section 12.3.1.

<u>Accident Dose Calculation</u>

No change to the accident dose calculation described in Section 12.3.1.