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November 14, 2022
E-61743

U. S. Nuclear Regulatory Commission
Attn: Document Control Desk
One White Flint North
11555 Rockville Pike
Rockville, MD 20852

Subject: Application for Amendment 3 to NUHOMS® EOS Certificate of Compliance No. 1042, Revision 10 (Docket 72-1042, CAC No. 001028, EPID: L-2021-LLA-0055) – Additional Information regarding ASME NOG-1 Compliance and the Matrix Loading Crane (MX-LC)

Reference: [1] Letter E-61399 from Prakash Narayanan, Application for Amendment 3 to NUHOMS® EOS Certificate of Compliance No. 1042, Revision 8 (Docket 72-1042, CAC No. 001028, EPID: L-2021-LLA-0055) – ASME NOG-1 Compliance and the Matrix Loading Crane (MX-LC), dated September 30, 2022

[2] 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

Based on interaction with the NRC, the Reference [1] submittal provided additional detail to demonstrate the single failure proof capability of the Matrix Loading Crane (MX-LC). Reference [1] included new updated final safety analysis report (UFSAR) Section A.2.1.4.2.1, which contains subsections with discussion associated with the design of the MX-LC relative to the single failure proof provisions of ASME NOG-1 (NOG-1), “Rules for Construction of Overhead and Gantry Cranes (Top Running Bridge, Multiple Girder).”

While NOG-1 covers multiple types of cranes, and multiple variants within those types, the MX-LC is unique in that it is a telescopic gantry crane with jacking towers, and not an electric overhead traveling crane, as described in NOG-1. As such, there are multiple sections of NOG-1 that do not apply to the MX-LC.

In order to further facilitate NRC review and acceptance of the single-failure-proof capability of the MX-LC, relative to the requirements of NOG-1, this submittal provides additional information involving a listing of each NOG-1 requirement, indication as to whether each requirement applies, or does not apply, discussion of non-applicability for requirements that do not apply, and discussion of the manner in which compliance is met for requirements that do apply.

Enclosures transmitted herein contain SUNSI. When separated from enclosures, this transmittal document is decontrolled.

While this NOG-1 listing should be sufficient to assess MX-LC compliance with the design criteria of NOG-1, additional supporting information, for objective evidence related to the actual design analysis, is provided herein, should the NRC staff wish to assess any aspects at a more detailed level.

In order to associate the detailed NOG-1 compliance information provided to the CoC 1042 Amendment 3 licensing basis, the UFSAR is revised to account for, and reference, this submittal.

The submittal contains the following enclosures:

- Enclosure 2 provides a proprietary version of a table of each NOG-1 requirement and discussion of MX-LC applicability and compliance. Since Enclosure 2 contains entirely proprietary information, no public version is provided.
- Enclosure 3 provides a listing of changed UFSAR pages resulting from this Revision 10 to the application for Amendment 3.
- Enclosure 4 provides the UFSAR changed pages associated with this Revision 10 to the application for Amendment 3. The changed pages include a footer annotated as "72-1042 Amendment 3, Revision 10, November 2022," with changes indicated by italicized text and revision bars. The changes are further annotated with gray shading or a gray box enclosing an added section, as well as a footer to distinguish the Amendment 3, Revision 10 changes from previous Amendment 3 changes.
- Enclosure 5 provides a listing of objective evidence files associated with the Enclosure 2 NOG-1 compliance assessment, and the objective evidence files themselves. Since Enclosure 5 contains entirely proprietary information, no public version is provided.

Certain portions of this submittal include proprietary information, which may not be used for any purpose other than to support the NRC staff's review of the application. In accordance with 10 CFR 2.390, TN Americas LLC is providing an affidavit (Enclosure 1), specifically requesting that this proprietary information be withheld from public disclosure.

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. Affidavit Pursuant to 10 CFR 2.390
2. Table of NOG-1 Requirements and MX-LC Compliance (Proprietary)
3. List of UFSAR Pages Involved in CoC 1042 Amendment 3, Revision 10
4. CoC 1042 Amendment 3, Revision 10 UFSAR Changed Pages
5. Supporting Information Files (List and Files) (Proprietary)

AFFIDAVIT PURSUANT TO 10 CFR 2.390

TN Americas LLC)
State of North Carolina) SS.
County of Guilford)

I, Prakash Narayanan, depose and say that I am Chief Technical Officer of TN Americas LLC, duly authorized to execute this affidavit, and have reviewed or caused to have reviewed the information that is identified as proprietary and referenced in the paragraph immediately below. I am submitting this affidavit in conformance with the provisions of 10 CFR 2.390 of the Commission's regulations for withholding this information.

The information for which proprietary treatment is sought is contained in the following enclosures, as listed below:

- Enclosure 2 - Table of ASME-NOG-1 Requirements and MX-LC Compliance
- Enclosure 5 - Supporting Information Files

These documents have been appropriately designated as proprietary.

I have personal knowledge of the criteria and procedures utilized by TN Americas LLC in designating information as a trade secret, privileged or as confidential commercial or financial information.

Pursuant to the provisions of paragraph (b) (4) of Section 2.390 of the Commission's regulations, the following is furnished for consideration by the Commission in determining whether the information sought to be withheld from public disclosure, included in the above referenced document, should be withheld.

1) The information sought to be withheld from public disclosure involves the Table of ASME-NOG-1 Requirements and TN's MX-LC Compliance and the Supporting Information files, all related to the design of the NUHOMS® EOS System, specifically the MX-LC design details, which are owned and have been held in confidence by TN Americas LLC.

2) The information is of a type customarily held in confidence by TN Americas LLC, and not customarily disclosed to the public. TN Americas LLC has a rational basis for determining the types of information customarily held in confidence by it.

3) Public disclosure of the information is likely to cause substantial harm to the competitive position of TN Americas LLC, because the information consists of descriptions of the design and analysis of dry spent fuel storage systems, the application of which provide a competitive economic advantage. The availability of such information to competitors would enable them to modify their product to better compete with TN Americas LLC, take marketing or other actions to improve their product's position or impair the position of TN Americas LLC's product, and avoid developing similar data and analyses in support of their processes, methods or apparatus.

Further the deponent sayeth not.

A Prakash

Prakash Narayanan
Chief Technical Officer

LAURA L. ALAMILLO NOTARY PUBLIC GUILFORD COUNTY, NC

North Carolina
Guilford County

Subscribed and sworn before me this 10th day of November 2022.

Laura L. Alamillo
Notary Public

My Commission Expires 10 / 08 / 2024

Enclosure 2 to E-61743

Table of NOG-1 Requirements
and MX-LC Compliance

Withheld Pursuant to 10 CFR 2.390

List of UFSAR Pages
Involved in CoC 1042 Amendment 3, Revision 10

UFSAR Pages
A.2-4
A.2-33

Enclosure 4 to E-61743

CoC 1042 Amendment 3, Revision 10

UFSAR Changed Pages

The MX-LC is used to position the TC skid in the proper position to dock the TC to the HSM-MX at the designated compartment (either upper or lower compartment) of the HSM-MX for the purpose of inserting the DSC into the HSM-MX or withdrawing it from the HSM-MX. The TC skid (TS) with the attached TC is transferred from the transfer trailer (TT) or self-propelled modular transporter (SPMT) to the MX-LC, where the lift links are connected to the TC skid and the TC skid is subsequently detached from and lifted off the transfer trailer/SPMT. Operationally, the MX-LC travels along the face of the HSM-MX on rails positioned on the ISFSI apron, lifts the TC skid to the proper height, and docks the TC to the HSM-MX. Refer to Figure A.2-2 for details of the MX-LC component.

The MX-LC is a unique telescopic gantry crane with jacking towers, and not an electric overhead traveling crane, as described in ASME NOG-1 [A.2-7], and as such, there are multiple sections of ASME NOG-1 [A.2-7] that do not apply to the MX-LC. Those portions of ASME NOG-1 that are not applicable to the design of the MX-LC involve features for a typical gantry crane with a top running wire rope hoist and trolley unit that do not exist on a telescoping gantry crane with self-locking screw mechanisms. Therefore, the MX-LC component parts must be addressed individually, with regards to applicable criteria located within U.S. NRC regulatory guides and nuclear and non-nuclear industry standards, for the purpose of confirming its single-failure-proof handling capability. The following sections outline the integration of the standards and substantiate the safety of the described systems. A detailed ASME NOG-1 compliance assessment of the MX-LC is provided in Reference [A.2-21].

The MX-LC is designed and analyzed to meet the intent of NUREG-0612 [A.2-9], "Control of Heavy Loads at Nuclear Power Plants,"

> *"To provide adequate measures to minimize the occurrence of the principal causes of load handling accidents and to provide an adequate level of defense-in-depth for handling heavy loads near spent fuel and safe shutdown systems."*

Understanding the ISFSI does not have 10 CFR Part 50 safe shut down equipment or a spent fuel pool, it is recognized that the DSCs loaded with fuel must be safely and securely handled, thereby protecting the fuel from damage and protecting the site and surrounding areas from any potential radiological impacts. Even though the potential for a radiological release is very low, the design objective of the MX-LC is to prevent the occurrence of load handling accidents. Therefore, the licensing basis for the MX-LC is to provide a lifting and handling system that is robust to failure highly reliable, which makes the likelihood of a load drop event extremely small.

A.2-18 CoC 1042 Appendix A, NUHOMS® EOS System Generic Technical Specifications, Amendment *3*.

A.2-19 NOT USED

A.2-20 ANSI 57.9-1984, Design Criteria for an Independent Spent Fuel Storage Installation (Dry Type).

A.2-21 Letter E-61743 from Prakash Narayanan, Application for Amendment 3 to NUHOMS® EOS Certificate of Compliance No. 1042, Revision 10 (Docket 72-1042, CAC No. 001028, EPID: L-2021-LLA-0055) - Additional Information regarding ASME NOG-1 Compliance and the Matrix Loading Crane (MX-LC), dated November 14, 2022.

All Indicated Changes are associated with Enclosure 2

Enclosure 5 to E-61743

CoC 1042 Amendment 3, Revision 10

Supporting Information Files

Withheld Pursuant to 10 CFR 2.390

The following is a listing of the supporting documents associated with Enclosure 2:

1. Drawing 41041-LC-1000, Rev. 2, “NUHOMS® HSM-MX Loading Crane (MX-LC) General Arrangement & General Notes”
2. Drawing 41041-LC-1001, Rev. 1, “NUHOMS® HSM-MX Loading Crane (MX-LC) MX-LC Lift Link Assembly General Arrangement”
3. Drawing 41041-LC-1002, Rev. 1, “NUHOMS® HSM-MX Loading Crane (MX-LC) MX-LC Upper Boom Assembly General Arrangement”
4. Drawing 41041-LC-1003, Rev. 1, “NUHOMS® HSM-MX Loading Crane (MX-LC) MX-LC Gantry Box & Lower Boom General Assembly”
5. Drawing 41041-LC-1004, Rev. 0, “NUHOMS® HSM-MX Loading Crane (MX-LC) MX-LC Boom-To-HSM Connection”
6. Drawing 41041-LC-1006, Rev. 1, “NUHOMS® HSM-MX Loading Crane (MX-LC) MX-LC Chocks”
7. Drawing 41041-LC-1007, Rev. 2, “Fasteners for Interface of Matrix Loading Crane, Skid and HSM”
8. Drawing 41041-LC-1008, Rev. 0, “MX-LC Contingency Plan”
9. Drawing 41041-TRK-1000, Rev. 0, “NUHOMS® HSM-MX Loading Crane (MX-LC) MX-LC Track General Arrangement, General Assembly”
10. Drawing 41041-TRK-1001, Rev. 0, “NUHOMS® HSM-MX Loading Crane (MX-LC) MX-LC Track General Arrangement, Typ. 15' Track Section”
11. Drawing 41041-TRK-1002, Rev. 0, “NUHOMS® HSM-MX Loading Crane (MX-LC) MX-LC Track General Arrangement, 15' Track Section w/ End Stop”
12. Drawing 41041-TRK-1003, Rev. 0, “NUHOMS® HSM-MX Loading Crane (MX-LC) MX-LC Track General Arrangement, 10' Track Section”
13. Drawing 41041-TRK-1004, Rev. 0, “NUHOMS® HSM-MX Loading Crane (MX-LC) MX-LC Track General Arrangement 15' Track/Ramp Interface Section & Ramp”
14. Drawing 41041-SHIM-1000, Rev. 1, “NUHOMS® Matrix System Track Shim Main Assembly”
15. Drawing 41041-TS-1000, Rev. 0, “NUHOMS® HSM-MX Transfer Skids MX-LC Transfer Skids General Notes”
16. Drawing 41041-TS-1001, Rev. 0, “NUHOMS® HSM-MX Transfer Skids EOS Transfer Skid Main Assembly”
17. Drawing 41041-TS-1004, Rev. 0, “NUHOMS® HSM-MX Loading Crane (MX-LC) MX-LC TS-To-HSM Connection”
18. Calculation 41041-0201, Rev. 1, “MATRIX Loading Crane Member Design”
19. Calculation 41041-0202, Rev. 0, “EOS Transfer Skid Design”
20. Calculation 41041-0203, Rev. 0, “Matrix Loading Crane Gantry Box Design”
21. Calculation 41041-0204, Rev. 1, “Matrix Loading Crane Connection Design”
22. Calculation 41041-0205, Rev. 0, “MATRIX Loading Crane Stability Analysis”
23. Calculation 41041-0215, Rev. 0, “MX-LC Mechanical Component Design”
24. Calculation 41041-0225, Rev. 1, “Matrix Track Shim Channel Assembly Structural Evaluation”
25. Calculation 41041-0227, Rev. 0, “Structural Evaluation, Matrix Loading Crane Chocks”
26. Calculation 41041-0228, Rev. 0, “Structural Analysis of Bolts for MX-LC Connections”
27. Calculation 41041-0229, Rev. 0, “MX-LC TC Lowering Contingency Plan”
28. Calculation 41041-0231, Rev. 0, “MX-LC (Loaded with EOS-TC125) Overturning Stability Evaluation for Tornado Wind and Missile”
29. Calculation 41041-0232, Rev. 0, “MX-LC (Loaded with EOS-TC125) Overturning Stability Evaluation for Operating and Tornado Wind and Missile (Elevated Position) and Lateral Deflection Estimation due to Operating Wind”

30. Design Criteria Document 41041-0101, Rev. 2, “Design Criteria Document (DCD) for the Matrix Loading Crane and Retractable Roller Trays, and Associated Equipment”
31. Design Criteria Document 41041-0102, Rev. 0, “Control System Requirements for the Handling Equipment Associated with the Loading of the Matrix HSM”
32. Design Report 41041-0103, Rev. 3, “Design Report for the Matrix NUHOMS® Matrix Loading Crane and Associated Transfer Equipment”
33. Specification 590624-LC, Rev. 3, “Matrix Loading Crane Functional Specification”