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E-59397

U. S. Nuclear Regulatory Commission
Director of the Office of Nuclear Material Safety and Safeguards
Attn: Document Control Desk
One White Flint North
11555 Rockville Pike
Rockville, MD 20852

Subject: Proposed Alternative to the ASME Code, NG-4230 Tack Welds,
Docket 72-1004, CoC 1004, for Recent Amendments

In accordance with the identical provision cited for each Certificate of Compliance (CoC) No. 1004 amendment listed below, TN Americas LLC (TN) requests an alternative to the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel (B&PV) Code Section III, Division 1, Article NG, Subsection NG-4000 for Visual Examination (VT) requirements of tack welds of the NUHOMS® 61BTH Type 2 Dry Shielded Canister (DSC), R45 transition rails, for each of the cited amendments.

- Paragraph 4.2.4 of CoC 1004 Appendix A, NUHOMS® System Generic Technical Specifications (TS), Renewed Amendment 13, Revision 1, as corrected
- Paragraph 4.2.4 of CoC 1004 Appendix A, TS, Renewed Amendment 14
- Paragraph 4.2.4 of CoC 1004 Appendix A, TS, Renewed Amendment 15
- Condition II.1.d of CoC 1004, Renewed Amendment 16
- Condition II.1.d of CoC 1004, Renewed Amendment 17

The alternative is requested only for the weld joints of the R45 transition rails between parts 1 and 2 of updated final safety analysis report (UFSAR) Drawing NUH61BTH-2003-SAR, Revision 2. No other components of the basket assembly are included. An illustration of the weld joint locations is provided in Enclosure 2.

Background

CoC 1004 Amendments 13, 14, and 15 TS 4.2.2, and Amendment 16 and 17 CoC Condition II.1.b, each state that DSCs are designed fabricated, tested, and inspected to the maximum practical extent in accordance with ASME B&PV Code Section III, Division 1, Subsections NB, NF, and NG for Class 1 components and supports. The R45 transition rails of the 61BTH Type 2 basket are classified as NG components in Section T.2.5.1 of Appendix T to the 61BTH DSC Design Criteria of the CoC 1004 UFSAR, Revision 20.

Tacks welds are used during the fit-up and alignment of the welded components of the R45 transition rails. The use of tack welds is standard practice for keeping parts closely together while completing the first pass, or root pass, of a production weld.

Paragraph NG-4231.1 states, *“Tack welds used to secure alignment shall either be removed completely, when they have served their purpose, or their stopping and starting ends shall be properly prepared by grinding or other suitable means so that they may be satisfactorily incorporated into the final weld. Tacks welds shall be made by qualified welders using qualified welding procedures. When tack welds are to become part of finished weld, they shall be visually examined in accordance with NG-5261 and defective tack welds shall be removed.”*

TN believes the intent of the cited paragraph is to ensure that the final welds do not contain defects in the root pass from defective tack welds made during fit-up and alignment. The use of a qualified inspector for identification of defective tack welds is a means for providing this assurance. TN believes that the welding process and equipment used for completing the final weld can be qualified to achieve an acceptable level of quality and safety, thereby eliminating the need for a qualified inspector to perform the visual examination (VT) of NG-4231.1.

Proposed Alternative

Along with the option to full comply with NG-4231.1, if practicable, the proposed alternative option to Paragraph NG-4231.1 is as follows:

The VT examination required by NG-4231.1 may be omitted for the welds of R45 Transition Rails of the NUHOMS® 61BTH Type 2 DSC when the following additional requirements are met:

1. The welder or weld supervisor shall check the tack welds for defects and shall either remove or repair the defective tack welds in the process of fit-up and alignment.
2. The welding procedure specification (WPS) and procedure qualification record (PQR) of the production welds shall contain the following additional qualification requirements for each joint geometry:
 - A. Three coupons shall be prepared that simulate the joint geometry that will be used in production. A tack weld shall be completed and broken.
 - B. The weld shall be completed with parameters that correspond to the minimum weld filler deposition rate allowed by the WPS.
 - C. The coupons shall be cross-sectioned, etched, and verified under magnification that the weld has satisfactorily incorporated the tack weld and the defect has been removed.
3. An additional PQR shall be prepared in accordance with ASME Section IX with coupons that were produced with three broken tack welds per coupon at fit-up. The coupons shall pass all applicable testing requirements of ASME Section IX.
4. Production welds shall be made by either an automated welding or mechanized welding process. Only the tack weld may be completed by a manual process.

Enclosure 3 shows how the alternative would appear in the form of the typical code alternatives table in the licensing basis.

Justification

As previously stated, the intent of Paragraph NG-4231.1 is to provide reasonable assurance that defects in tack welds are not present in the final weld, which would reduce the effective throat available in the final weld. TN believes that additional controls in fabrication can be implemented that provide equivalent reasonable assurance that no defects from the tack weld are present in the final weld.

TN will have an individual qualified to perform or supervise the welding check for defective tack welds, and identified defective tack welds will be removed or repaired. The difference is that the

individual will not be a qualified inspector. This continues to ensure that defects in tack welds, such as a crack or complete fracture, are not present during completion of the final weld. This approach in allowing the welder or weld supervisor to check a tack weld for defects is in alignment with the requirements of Paragraph NB-4123, shown below.

NB-4123 Examinations

Visual examination activities that are not referenced for examination by other specific Code paragraphs, and are performed solely to verify compliance with requirements of NB-4000, may be performed by the persons who perform or supervise the work. These visual examinations are not required to be performed by personnel and procedures qualified to NB-5500 and NB-5100, respectively, unless so specified.

In addition to the qualification requirements of ASME Section IX, the code alternative requires demonstration that production welding can re-consume a defective tack weld and obtain proper fusion in the root pass. The coupons will be welded with parameters that result in the lowest possible deposition rate allowed by the WPS. Verification by means of destructive testing that demonstrates the defect is removed and proper fusion is achieved will qualify the welding process. Use of a production weld to eliminate a defective tack weld is analogous to the provision of Paragraph NB-4423. Paragraph NB-4423 allows a fabricator to omit the back-gouging of defects and contaminants of a double welded joint through demonstration that the welding process can penetrate the defective area of the weld and obtain proper fusion.

The third requirement in the code alternative is an additional PQR of coupons that contain three broken tack welds at the time of fit-up. Destructively testing these coupons ensures the minimum mechanical properties are achieved even with the presence of broken tack welds.

The fourth requirement in the code alternative is to prohibit the use of manual welding for the completion of the production weld. By only using automated or mechanized welding equipment, the allowance for human error is effectively minimized, which will further ensure the root pass of the production weld is bound by the aforementioned qualification.

All other requirements of the ASME code for welding, welders, and filler metals, and the NDE required for the completed weld, remain unchanged.

The requirement for dimensional inspection of the completed R45 transition rail is required, regardless of a fabricator electing to use this code alternative. The R45 transition rail meeting its dimensional requirements of the design drawing assures that its primary design function, which is transfer of structural loads between the basket and shell, are maintained as described in the UFSAR for all normal, off-normal, and accident conditions. Secondary design functions of the R45 Transition Rails, such as thermal, criticality, and shielding, remain unaffected since geometrical attributes of the design drawing are verified and structural integrity of the welds are not affected by the proposed code alternative.

Conclusion

In summary, along with the option to full comply with NG-4231.1, if practicable, TN is requesting an alternative to the ASME Paragraph NG-4231.1 requirement for tack welds of the R45 transition rails to be inspected by a qualified inspector. Compensatory measures are proposed including 1) verification that defective tack welds are either repaired or removed, performed by the welder or weld supervisor, 2) additional welding qualification requirements to ensure a

defective tack weld is repaired by the root pass of the production weld, 3) welding qualified is shown to achieve minimum mechanical even with broke tack welds, and 4) the welding equipment that can be used for the root pass is restricted to automated or mechanized. TN finds these compensatory measures acceptable to ensure the welds of the R45 transition welds provide an equivalent level of quality and safety.

Enclosure 2 of this submittal includes proprietary information, which may not be used for any purpose other than to support NRC staff review of the proposed code alternative. In accordance with 10 CFR 2.390, I am providing an affidavit (Enclosure 1) specifically requesting that you withhold this proprietary information from public disclosure. Because Enclosure 2 is entirely proprietary, no public version is provided.

As previously discussed with NRC staff, NRC approval is respectfully requested as soon as practical to support on-going and future fabrication of the 61BTH Type 2 basket. If the NRC staff has any questions regarding this submittal, please do not hesitate to contact Mr. Doug Yates at 434-832-3101, or douglas.yates@orano.group.

Sincerely,



Prakash Narayanan
Chief Technical Officer

cc: Christian Jacobs (NRC-DFM)

Enclosure 1: Affidavit Pursuant to 10 CFR 2.390
Enclosure 2: Location of Applicable Weld Joints (Proprietary)
Enclosure 3: Proposed Code Alternative Table Entry

Enclosure 2 to E-59397

Location of Applicable Weld Joints (Proprietary)

Withheld Pursuant to 10 CFR 2.390

Proposed Code Alternative Table Entry

Reference ASME Code Section/Article	Code Requirement	Alternatives, Justification and Compensatory Measures
NG-4231.1	<p><i>Tack welds used to secure alignment shall either be removed completely, when they have served their purpose, or their stopping and starting ends shall be properly prepared by grinding or other suitable means so that they may be satisfactorily incorporated into the final weld. Tacks welds shall be made by qualified welders using qualified welding procedures. When tack welds are to become part of finished weld, they shall be visually examined in accordance with NG-5261 and defective tack welds shall be removed</i></p>	<p>Along with the option to full comply with NG-4231.1, if practicable, the proposed alternative option to Paragraph NG-4231.1 is as follows:</p> <p>The VT examination required by NG-4231.1 may be omitted for the welds of R45 Transition Rails of the NUHOMS® 61BTH Type 2 DSC when the following additional requirements are met:</p> <ol style="list-style-type: none"> 1. The welder or weld supervisor shall check the tack welds for defects and shall either remove or repair the defective tack welds in the process of fit-up and alignment. 2. The welding procedure specification (WPS) and procedure qualification record (PQR) of the production welds shall contain the following additional qualification requirements for each joint geometry: <ol style="list-style-type: none"> A. Three coupons shall be prepared that simulate the joint geometry that will be used in production. A tack weld shall be completed and broken. B. The weld shall be completed with parameters that result in the minimum weld filler deposition rate allowed by the WPS. C. The coupons shall be cross-sectioned, etched, and verified under magnification that the weld has satisfactorily incorporated the tack weld and the defect has been removed. 3. An additional PQR shall be prepared in accordance with ASME Section IX with coupons that were produced with three broken tack welds per coupon at fit-up. The coupons shall pass all applicable testing requirements of ASME Section IX. 4. Production welds shall be made by either an automated welding or mechanized welding process. Only the tack weld may be completed by a manual process.