

May 11, 2015

U.S. Nuclear Regulatory Commission
11555 Rockville Pike
Rockville, MD 20852-2738

Attn: Document Control Desk

Subject: Submission of a Supplement for the Request for a Revision to Certificate of Compliance (CoC) No. 9225 for the NAC-LWT Cask to Incorporate Changes in HEUNL Container Spacer Design and Container Material Specification

Docket No. 71-9225

Reference:

1. Model No. NAC-LWT Package, U.S. Nuclear Regulatory Commission (NRC) Certificate of Compliance (CoC) No. 9225, Revision 63, May 5, 2015
2. ED20150009, "Submission of NAC-LWT Safety Analysis Report (SAR), Revision 43 Incorporating Highly Enriched Uranyl Nitrate Liquid (HEUNL) Contents," January 29, 2015
3. ED20150039, Submission of a Request for a Revision to Certificate of Compliance (CoC) No. 9225 for the NAC-LWT Cask to Incorporate Changes in HEUNL Container Spacer Design and Container Material Specification, March 30, 2015

NAC International (NAC) submitted a request for a revision to the NAC-LWT Certificate of Compliance (CoC) No. 9225, Revision 63 (Reference 1) to include changes in the HEUNL Container Spacer design and the container material specification via Reference 3. This submittal contained three typographical errors that need to be corrected. NAC is providing replacement pages for the LWT-15B submittal via Attachment 1 to this letter. Specifically, pages 2.6.12-131 and -132 have be corrected as follows:

1. Page 2.6.12-131, second to last sentence in the paragraph before the "1 Foot Bottom End Drop" section was revised to change "0.332 ksi" to "0.322 ksi"
2. Page 2.6.12-132, third to last sentence in the paragraph before the "1 Foot Top End Drop" section was revised to change "17.57 ksi" to "17.54 ksi"
3. Page 2.6.12-132, second to last sentence in the paragraph before the "1 Foot Top End Drop" section was revised to change "4.99" to "1.99"

If you have any comments or questions, please contact me on my direct line at 678-328-1236.

Sincerely,



Wren Fowler
Director, Licensing
Engineering

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Attachment:
Attachment 1 – LWT-15B Submittal Replacement Pages

ATTACHMENT 1

LWT-15B Submittal Replacement Pages

Sections P6, P7 and P13 are not shown in the figures but are located at the center of the container shell half way between the bottom end cap and the top end cap.

The allowable stress S_m for SA-240, Type 304 at 200 °F is 20 ksi.

Design Pressure Case

As identified in Section 8.1.4.4 the canister is to be hydrostatically tested to 140 +10/-0 psig. This condition is treated as a normal condition, which bounds the maximum pressure expected during normal operational conditions identified in Section 4.5.6. A pressure case of 150 psig was evaluated. For this case a 30° sector of the 180° model was used and the liquid region of material was eliminated.

The maximum membrane stress intensity from the 14 section cuts was 3.24 ksi and the maximum membrane plus bending stress intensity was 4.83 ksi. For the Normal Conditions of Transport, the margin of safety is 4.67 for the membrane stress and 5.21 for the membrane plus bending stress.

1 Foot Side Drop

For the side drop each container rests against the inner shell of the LWT cask. The gap elements on the outside surface of the guide bars have two nodes. The outermost nodes are constrained in the radial, tangential and axial direction. This boundary condition represents the inner surface of the LWT cask as rigid, which is a conservative approach since this produces higher loads on the container guide rails.

For the side drop case an acceleration of 25 g is applied in the lateral (X) direction.

The maximum membrane stress intensity from the 14 section cuts was 2.58 ksi and the maximum membrane plus bending stress intensity was 4.77 ksi. For the Normal Conditions of Transport, the margin of safety is 6.75 for the membrane stress and 5.29 for the membrane plus bending stress. For additional details refer to item 1 in Section 2.6.12.15.5.

The bearing stress between the guide rail and the inner surface of the LWT cask was also computed. Assuming that the entire weight of the filled container is supported by one guide rail, the bearing stress is 0.322 ksi. This gives a margin of safety greater than 10. For additional details refer to item 1 in Section 2.6.12.15.5.

1 Foot Bottom End Drop

For the bottom end drop case an acceleration of 25 g is applied in the vertical (Z) direction. The lowest container rests on the spacer ring, which rests on the bottom forging of the LWT cask. The vertical acceleration accounts for the weight of the lowest container; however, the remaining 3 containers are stacked on the top of the lowest container. To account for the weight of the other

three containers an equivalent pressure load is applied to the top of the FEA model for the bottom container.

The maximum membrane stress intensity from the 14 section cuts was 4.44 ksi and the maximum membrane plus bending stress intensity was 6.52 ksi. Comparing this to the allowable stress gives a margin of safety of 3.50 for the membrane stress and 3.60 for the membrane plus bending stress. For additional details refer to item 1 in Section 2.6.12.15.5.

The bearing stress between the lowest container and the top surface of the support spacer was computed. The bearing stress is 5.82 ksi. This gives a margin of safety against the yield strength of 3.30. The bearing stress between the bottom of the support ring and the bottom of the LWT cask was also checked. This bearing stress is 2.0 ksi, which gives a margin of safety greater than 10. For additional details refer to item 1 in Section 2.6.12.15.5.

The container wall was also evaluated for potential buckling with a standard closed form solution. The calculated critical buckling stress calculated was 131 ksi. Compared to the calculated compressive stress in the container wall of 5.96 ksi, the margin of safety is greater than 10. For additional details refer to item 1 in Section 2.6.12.15.5.

The revised support ring FEA model was utilized to evaluate this case. The maximum membrane stress intensity calculated was 6.70 ksi and the maximum membrane plus bending stress intensity was 17.54 ksi. Comparing this to the allowable stress gives a margin of safety of 1.99 for the membrane stress and 0.71 for the membrane plus bending stress. For additional details refer to item 1 in Section 2.6.12.15.5.

1 Foot Top End Drop

For the top end drop case an acceleration of 25 g is applied in the vertical (-Z) direction. The topmost container rests on the closure lid of the LWT cask. The vertical acceleration accounts for the weight of the lowest container; however, the remaining 3 containers are stacked on the top of the lowest container. To account for the weight of the other three containers, an equivalent pressure load is applied to the bottom of the FEA model of the top container.

The maximum membrane stress intensity from the 14 section cuts is 5.01 ksi and the maximum membrane plus bending stress intensity is 5.96 ksi. Comparing this to the allowable stress gives a margin of safety of 2.99 for the membrane stress and 4.03 for the membrane plus bending stress. For additional details refer to item 1 in Section 2.6.12.15.5.

The bearing stress between the topmost container and the bottom surface of the LWT cask closure lid was also checked. The bearing stress is 1.76 ksi, which gives a margin of safety greater than 10. For additional details refer to item 1 in Section 2.6.12.15.5.