

June 5, 2018

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

Attn: Document Control Desk

Subject: NAC's Responses to NRC's Request for Additional Information (NAC-STC Submittal 17D)

Docket No. 71-9235

- References:
1. Model No. NAC-STC Package, U.S. Nuclear Regulatory Commission (NRC) Certificate of Compliance (CoC) No. 9235, Revision 18, October 24, 2017
  2. Safety Analysis Report (SAR) for the NAC Storage Transport Cask (NAC-STC), Revision 18, NAC International, March 2017
  3. ED20170125, "NAC's Request for a Revision to Certificate of Compliance (CoC) No. 9235 for the NAC-STC (Submittal 17D)", December 8, 2017
  4. NRC Letter, "Application for the Model No. NAC-STC – Request for Additional Information", May 31, 2018

NAC International (NAC) hereby submits a partial response to NRC's Request for Additional Information (RAI) (Reference 4). NAC is in the process of revising drawing 423-927, which will address RAI #5. The response to that RAI, including a revised drawing, will be submitted at a later date. In reference to drawing 423-803, Revision 24, NAC recognizes there are two concurrent case reviews for the NAC-STC with the NRC. There are several administrative options for handling this situation. One, final NRC approval of this case can be held until the previous case is approved. Two, approval of both cases can be done concurrently via one Certificate of Compliance (CoC) revision. Three, should this case be approved prior to the other, a condition can be added to the CoC noting that the NRC has not approved those changes presented in Revision 23. For option three, the NRC issued a NAC-STC CoC in a similar fashion for approval of the West Valley contents which was done prior to the approval of high-burnup PWR fuel. There may be other ways of handling this scenario too. NAC finds any of these methods acceptable and will work with the NRC to determine the best path forward once the technical review of this case is concluded.

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

Sincerely,



Wren Fowler  
Director, Licensing  
Engineering

Enclosures:

Enclosure 1 – NAC International Responses to the United States Nuclear Regulatory Commission Request for Additional Information

NMSS01  
NMSS

**ENCLOSURE 1**

**NAC INTERNATIONAL**

**RESPONSES TO THE**

**UNITED STATES**

**NUCLEAR REGULATORY COMMISSION**

**REQUEST FOR ADDITIONAL INFORMATION**

**May 2018**

**FOR REVIEW OF THE CERTIFICATE OF COMPLIANCE NO. 9235, STC**  
**TRANSPORTATION PACKAGE**

**(CoC NO. 9235 DOCKET NO. 71-9235)**

**June 2018**

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**MATERIALS EVALUATION**

- 2.1 Justify the acceptance criteria (specification limits) assumed for the high-temperature properties of the elastomeric inner lid O-ring during the fire transient condition.

The applicant provided laboratory test data for the high-temperature properties of the O-ring during the fire transient condition, per the requirement in Title 10 of the *Code of Federal Regulations* (10 CFR) 71.73(c)(4) (Figure R-3, Calculation 423-3000, Revision 5). The data was acquired at a higher temperature than the actual maximum temperature that would be reached by the inner lid O-ring during the hypothetical fire condition. The laboratory test report defines an acceptance criteria (specification limits) for allowable changes to the O-ring properties; however, the application does not define the adequacy of these specification limits per the assumptions in the design-basis containment and structural analyses or models. The test results should demonstrate adequate margin of safety for the assumed specification limits.

The information is necessary to ensure compliance with 10 CFR 71.35(a).

NAC International Response to Acceptance and Maintenance Tests Evaluation RAI 2-1:

NAC has provided the vendor's laboratory test report for high temperature properties measured, i.e. "spec limits", for those same physical properties which validate the material's performance for the recommended temperature range of -40°F to 400°F. Specification Limits for the Dry Heat Resistance test were all met. As NAC's application is only 418°F for 1.5 hours, the test results indicate the material exposed to a higher temperature for a significantly longer period will maintain its performance characteristics. Further, NAC is providing the vendor's "Seal Life at Temperature" graph, Figure 2-28, from the Parker O-ring Handbook (ORD-5700), which indicates the VM835 Fluoroelastomer has a seal life of almost 100 hours at 418°F. See the following page for a copy of this figure.

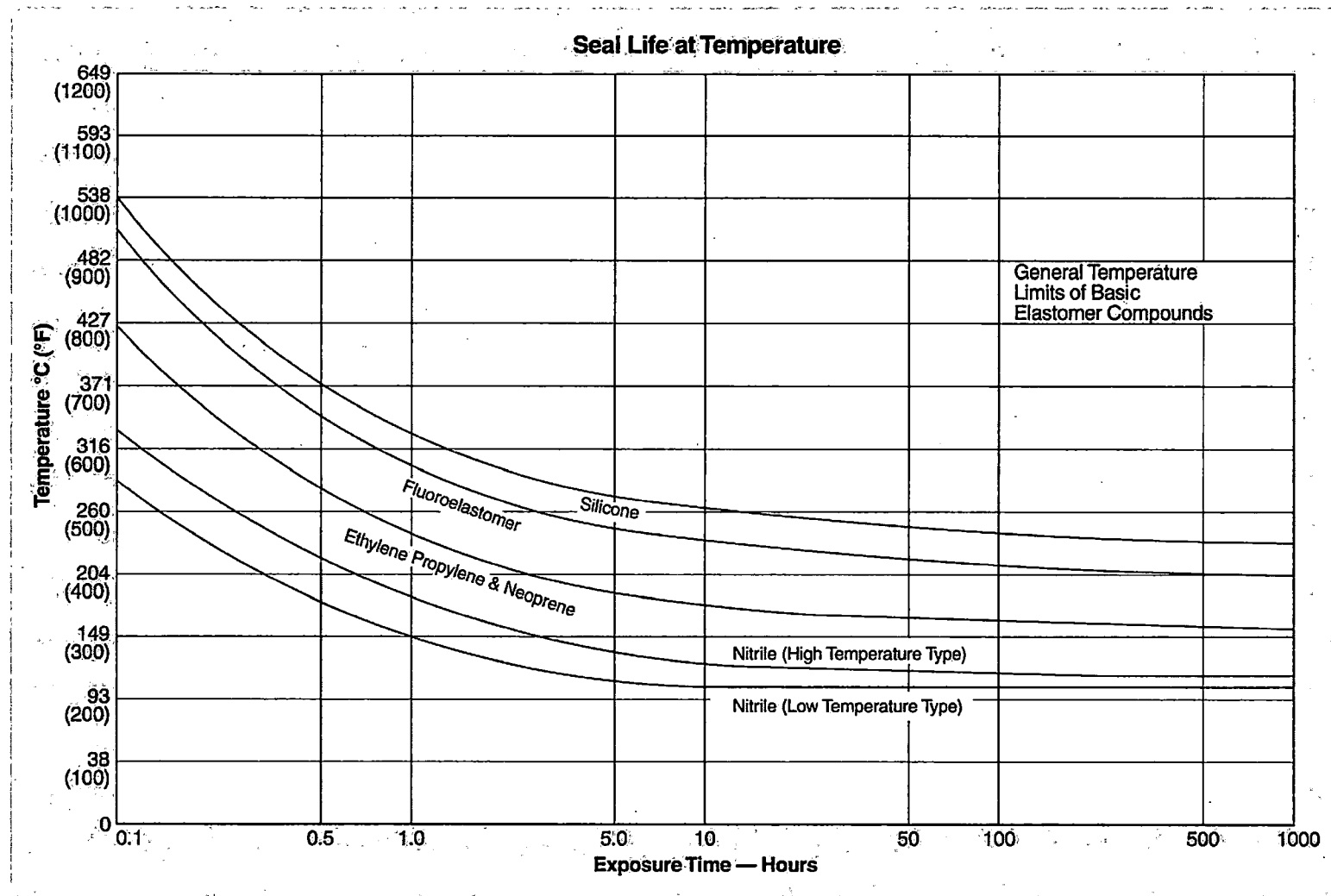


Figure 2-28: Seal Life at Temperature



**NAC INTERNATIONAL RESPONSE  
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**MATERIALS EVALUATION**

- 2.2 Clarify if the optional ceramic fiber insulation serves any safety function in the transportation package.

The revised package design includes a ceramic fiber paper used to provide insulation at the corners of the lead at each end of the cask during the hypothetical fire accident condition. Section 3.3.2 of the application states that the paper insulation is optional for the directly loaded NAC-STC package since the fire accident analysis shows that the lead temperature is maintained in its safe operating range even without its presence. The staff interprets the statement to imply that the ceramic fiber paper does not serve a safety function, please confirm if this is the case. If the configuration of the insulation is credited in the design-basis thermal safety analyses, then the applicant should justify that the ceramic fiber material will be able to sustain expected doses during transport and hypothetical fire transient temperatures (i.e., define a safe operating range in Section 3.3.2 and Section 3.8.3.2 of the application).

The information is necessary to ensure compliance with 10 CFR 71.35(a).

NAC International Response to Acceptance and Maintenance Tests Evaluation RAI 2-2:

The Fiberfrax insulation serves no safety function for directly loaded payloads as demonstrated in the revised Safety Analysis Report (SAR). The Fiberfrax is still required for other payloads since NAC has elected to not justify analytically its removal at this time. The current customer for NAC, which is procuring these casks, will be using them for directly loaded fuel shipments. In the future should there be a customer procuring a cask for canister-based shipment, NAC will most likely revise the SAR to make the insulation optional for canister-based shipments in a similar fashion to what has done for directly loaded fuel shipments.

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**MATERIALS EVALUATION**

- 2.3 Justify the adequacy of both the thermal and radiation resistance of the silicone caulk used for fixing/bonding of the optional ceramic fiber insulation.

Drawing No. 423-802, Revision 24, states that the optional ceramic fiber paper insulation may be fixed with a generic silicon caulk. If the configuration of the ceramic fiber insulation is credited in the design-basis thermal safety analyses, then the applicant should justify that the caulk material will be able to sustain expected doses and hypothetical fire transient temperatures.

The information is necessary to ensure compliance with 10 CFR 71.35(a).

NAC International Response to Acceptance and Maintenance Tests Evaluation RAI 2-3:

The silicone caulk is used specifically for the temporary attachment of the ceramic fiber insulation to the upper forging in support of the placement of the stainless sheath. Once installed, the stainless sheathing eliminates any need for the silicone caulk, therefore avoiding any long-term radiation or hypothetical accident performance requirement.

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- 2.4 Clarify in the pertinent drawings if the shield ring assembly may be used for Assembly 97, "STC-HBU".

Enclosure 3 of Document ED20170125 (page 2) states that the shield ring assembly applies to both Assembly 99, "STC", and Assembly 97, "STC-HBU" (see changes to Drawing No. 423-900, Revision 9). However, Drawing No. 423-927, Revision 0P, does not identify the shield ring assembly to apply to Assembly 97, "STC-HBU". The application must include a description of the proposed package in sufficient detail to identify the package accurately and provide a sufficient basis for evaluation of the package.

The information is necessary to ensure compliance with 10 CFR 71.31(a)(1).

NAC International Response to Acceptance and Maintenance Tests Evaluation RAI 2-3:

Drawing 423-927 is the Shield Ring Assembly drawing. It references 423-900 as the next assembly. On drawing 423-900, the Shield Ring Assembly is shown in the bill of materials as applicable to assembly -97 and -99. It is the 423-900 drawing that applies the shield ring to its respective cask body configuration.