Revision 1 to AREVA Inc. Response to RSI #2- Structural-NP (Public Version)

STRUCTURAL

RSI 2 structural (NON-PROPRIETARY)

1. Section 3.7.1.1.1, Stress Analysis. Provide a SAR synopsis in sufficient detail to clarify the SAR statement, "[A]n enveloping technique of combining various individual loads in a single analysis is used in this evaluation for several load combinations." It is unclear what the enveloping technique entails and how it is implemented for structural components with multiple critical sections of interest for reporting stress ratios. It appears that calculated maximum stresses of individual loading cases are simply added together for stress ratios determination even if maximum stresses associated with individual loading cases may have resulted at different locations of interest for the structural component involved.

   Therefore to address this, the SAR synopsis should use DSC stress analysis as an example by properly annotating the finite element analysis (FEA) model depicted in Figure 3.9.1-1 with sufficient detail to illustrate: (1) the element discretization for the closure-lid-to shell weld and (2) locations for all critical stress evaluation paths in both the closure lids and the DSC shell to facilitate safety review of the structural analysis model assumptions and stress results. To facilitate staff assessment of the applicability of approach, apply explicitly the technique with hand calculation to arrive at the maximum stresses, including locating the critically stressed DSC sections, for the two cases with large stress ratios: (1) Load Combination 7A for the DSC shell stress in Table 3.9.1-7 and (2) Load Combination 1 for the DSC ITCP in Table 3.9.1-9.

   This information is needed to meet the requirements of 72.236.

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TN Response to RSI 2 structural

This response supersedes the prior Revision 0 response to RSI 2 structural in its entirety.

NUHOMS® EOS Safety Analysis Report (SAR), Appendix 3.9.1 has been updated to reflect changes to the dry shielded canister (DSC) shell validation, including detail of the model and post-processing. The closure welds have been analyzed as capable of transmitting a moment between the DSC shell and the cover plates.

Applicable stress criteria for evaluating the results are described in SAR Section 3.9.1.2.2. The finite element model is described in SAR Section 3.9.1.2.3, including the mesh discretization. A sensitivity study was performed on the mesh density with the results summarized in SAR Table 3.9.1-14.

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A summary of the load cases simulated is provided in SAR Section 3.9.1.2.6. A description of the load combinations modeled is provided in SAR Section 3.9.1.2.7.

Based on these results, the maximum ratio of induced load to allowable load for a confinement boundary area is 0.83, in the weld between the ITCP and the DSC shell during a side drop event. However, the maximum ratio of induced load to allowable load anywhere in the DSC assembly of 0.90 is located separate from the confinement boundary welds in the DSC shell during DSC extraction from the HSM (max of level A and B). The DSC assembly is therefore structurally adequate under all anticipated load conditions for service during loading, transfer and storage.

EOS SAR, EOS Proposed CoC, EOS Proposed Technical Specifications (TS) Impact:

EOS SAR Appendix 3.9.1, Sections 3.9.1.2, 3.9.1.2.3, 3.9.1.2.4, 3.9.1.2.5, 3.9.1.2.6, 3.9.1.2.7, 3.9.1.3, 3.9.1.5.1, 3.9.1.5.2 and 3.9.1.6 have been revised. Table 3.9.1-2, Table 3.9.1-4, Table 3.9.1-7, and Tables 3.9.1-8 through 3.9.1-13 have been revised. Table 3.9.1-7a and Table 3.9.1-14 have been added. Figures 3.9.1-1 through 3.9.1-21 have been either revised or added.

EOS SAR Appendix 3.9.3, Sections 3.9.3.2, 3.9.3.3, 3.9.3.3.1, 3.9.3.3.3, 3.9.3.3.4, 3.9.3.4 have been revised. Tables 3.9.3-1 through 3.9.3-9 have been deleted. Figure 3.9.3-8, Figure 3.9.3-11 through 3.9.3-16, Figure 3.9.3-18, and Figures 3.9.3-20 through 3.9.3-22 have been deleted.

The EOS proposed CoC has not been changed.

EOS proposed TS have not been changed.