

Enclosure 2 to E-46190

RAIs and Responses

RAI-2 Re-Issue #1:

Unresponsive Requests for Additional Information on the use of surrogate inspections in lieu of site-specific interior Horizontal Storage Module (HSM) inspections.

Staff's position/ Applicant's action:

The use of surrogate inspections has not been adequately justified. The applicant is asked to remove all references to the use of surrogate inspections in the HSM Aging Management Program for External and Internal Surfaces, and in the proposed supplement to the Final Safety Analysis Report.

HSM:

Revise the application to remove all references to the use of surrogate inspections in the HSM Aging Management Program (AMP) for External and Internal Surfaces, and in the proposed supplement to the Final Safety Analysis Report.

The staff considers that the applicant did not adequately respond to questions in HSM-RAI-2-3. The following discussion provides the basis for the staff's conclusion.

The applicant stated in the License Renewal Application, Rev. 1 that "Independent spent fuel storage installation (ISFSI) sites eligible to use surrogate inspections of the HSM internal surfaces are sites that generally have a benign climate, where little or no aging degradation is expected." The staff found the criteria to be overly general and inadequate. Therefore, the staff requested that the applicant provide clear and defensible specific criteria (i.e. with valid technical bases and supporting operating experience) for determining if a given general-licensed site is in a benign environment. In its response, the applicant merely clarified that "a benign climate would be manifested in little or no degradation of the HSM internal concrete and metallic surfaces of the HSM, as demonstrated by meeting the HSM AMP inspection criteria for the first inspection carried out after about 20 years of service". The applicant did not provide a valid technical bases with supporting operating experience that the revised criteria would be adequate. Instead, the applicant referred to the Safety Evaluation Report (SER) of the renewal of specific-license for the H.B. Robinson ISFSI, which concluded that "There are no aging effects that require aging management during the renewed license period for the subcomponents located inside the HSM." The staff had previously pointed out to the applicant in HSM-RAI-17 that age-related degradation of HSM interior subcomponents has been observed in inspections since issuance of that SER. In addition, the NRC issued an Information Notice (IN 2013-07) on design-related issues of similar HSMs, which were determined to increase the rate of age-related degradation of HSM structures. The applicant disregarded the relevance of the more recent operating experience by stating: "From a surrogate criteria development standpoint, these conditions are not relevant because they are external surfaces related issues." The staff does not agree with the applicant's conclusion, as the results of the Calvert Cliffs ISFSI pre-application inspections demonstrated that exterior inspections are not sufficient for identifying potential degradation of the interior of the HSM structure (ML12212A216). The inspections of two horizontal storage modules in the Calvert Cliffs ISFSI revealed water intrusion and efflorescence of calcium hydroxide on the HSM roof. The staff,

therefore, does not find merit in referencing the findings in the previous SER for the H.B. Robinson ISFSI renewal and considers the response inadequate.

The staff also requested a technical bases (operating experience, consensus guides, etc) that would validate the adequacy of the specific variability limits in the proposed "Environmental Parameters Criteria" for selecting surrogate sites. The staff clarified that the application did not discuss how the proposed variability limits on environmental parameters have been proven adequate for defining sites in a similar benign environment, based on specific generic nuclear or non-nuclear operating experience or consensus codes/guides. The staff further clarified that the operating experience should validate the proposed variability criteria with a discussion on how each of the parameters prove adequate for identifying age-related degradation at multiple sites. The staff stated that an adequate database of operating experience from interior inspections of HSMs is lacking, but would consider non-nuclear generic operating experience if relevancy was justified. In its response, the applicant did not properly address the question, as a technical basis with relevant operating experience was not provided. Instead, the applicant revised the variability limits in the criteria and concluded them reasonable. The staff, therefore, considers the response inadequate.

Following the issuance of HSM-RAI-2-3, the applicant revised the application to clarify that baseline inspections would need to be performed at every general-licensed site. The staff agrees with this position. However, the staff requested valid technical bases (operating experience, consensus guides) in support of the proposed criteria for surrogate inspections beyond the baseline inspection, which the applicant did not provide. The staff guidance in NUREG-1927, Rev. 1 (ML16179A148) states: *The reviewer may accept the use of surrogate inspections (inspections conducted at other sites as a substitute for inspections conducted at the site(s) within the subject license or CoC) for identifying the relevant aging mechanisms and effects in the renewal application, but only when the technical basis is supported by substantial operating experience. Differences in materials, fabrication practices, design modifications, and environmental conditions at various sites could make comparisons between different ISFSI sites invalid.* The staff followed the guidance in NUREG-1927, Rev. 1 and finds that the applicant has not reasonably demonstrated that the use of surrogate inspections of the HSM interior for 40 years following the initial baseline inspection will assure that the HSM subcomponents perform their intended safety functions. Therefore, all references to the use of surrogate inspections in the HSM Aging Management Program for External and Internal Surfaces, and in the proposed supplement to the Final Safety Analysis Report need to be removed.

This information is required to ensure compliance with 10 CFR 72.240(c).

RESPONSE TO RAI-2 Re-Issue #1:

Based on this RAI-2 Re-Issue #1 and recent discussion with NRC staff, AREVA is withdrawing the option to use surrogates for the HSM Aging Management Program for External and Internal Surfaces. Until there is sufficient operating experience (OE) available to justify the use of surrogates for the HSM Aging Management Program for External and Internal Surfaces, AREVA will leave this provision out of the renewal application.

The description of the AMP for External and Internal Surfaces in Section 6A.5.5.1 has been revised to delete mention of the possible use of surrogate inspections. The summary description of the sample size for this AMP in Attachment A, Table A-4 has also been revised to delete mention of the use of another site's prior inspections (i.e., surrogates), and the description of their use in Section 6A.9 has been deleted. Tables 6A-4 and 6A-5, and Figure 6A-1 that were included in Section 6A.9 have also been deleted.

Based on the recent discussion with NRC staff, AREVA understands that the renewal licensing basis can be changed pursuant to the appropriate change process to introduce the use of surrogates for this aging management program once sufficient supporting OE and clear defensible data are available.

Renewal Application Impact:

Section 6A.5.5.1 and Attachment A, Table A-4 have been revised as described in the response. The corresponding content in Section 6A.9 has also been deleted.

Tables 6A-4 and 6A-5 and Figure 6A-1 have also been deleted as described in the response.

RAI-2 Re-Issue #2:

RAI responses have not been sufficiently justified.

Staff's position/ Applicant's action:

Applicant should remove information in question or provide sufficient justification.

THERMAL/CONFINEMENT:

Clarify or update portions of the 67009-TLAA22 and 67009-TLAA09 calculation packages so that a review of the dose rate calculation can be performed.

- A. Clarify the extent (i.e., percentage) of the nuclides considered in the dose rate calculations to justify statements, such as in Section 4.2 of 67009-TLAA22 that “a majority of the dose rate is attributed to relatively few nuclides” and “the nuclides listed in Table 4-7 and Table 4-8 account for majority of the total dose rate from the DSCs.” For example, respond whether the “majority” is based on the threshold values described in Section 7.3, or provide information to quantify (51% or 99.99%) the extent of the majority attributed to the dose rate.
- B. The 67009-TLAA22 calculation package focused on an “accident” condition confinement dose analysis even though the relevant NUHOMS 37PTH and NUHOMS 69BTH DSCs are “leaktight”. Update the accident condition confinement dose analysis provided in the 67009-TLAA22 calculation package to recognize that the Transfer Cask is not the confinement boundary. In addition, note that calculation number 67009-TLAA009, which is relevant to NUHOMS 24P and NUHOMS 52B Dry Storage Canisters (DSC)s that are not “leaktight”, based the accident confinement dose analysis on a 30-day exposure time that is consistent with the guidance provided in NUREG-1536.
- C. Justify the fuel-to-DSC release fractions provided in Table 4-9 used in the dose rate calculation provided in the 67009-TLAA22 calculation package. The referenced release fractions were based on low burnup fuel, whereas the calculation assumed high burnup fuel.
- D. Justify the fluid temperature and pressure within the DSC that are used in the dose rate calculation provided in the 67009-TLAA22 calculation package. Table 4-11 indicates a 415.37 K fluid temperature and a 9.24 psig upstream pressure but there was no justification for these being a valid temperature or a valid pressure during the accident condition, which, for example, assumes 100% fuel rod rupture.
- E. Although the EXCEL spreadsheet for calculation package 67009-TLAA09 was provided, the spreadsheet for TLAA22 was not included and, therefore, sections of the confinement analysis could not be reviewed.
- F. Throughout the 67009-TLAA22 calculation package, there are statements to the effect that the internal pressure within the DSC is insufficient to propel radionuclide release such that there is no resulting dose impact. Such absolute statements should be modified or provide justification that there is no dose impact.

This information is needed to determine compliance with 10 CFR 72.238 and 72.236.

RESPONSE TO RAI-2 Re-Issue #2:

Comment A Response: Per NUREG-1536, Rev. 1, Section 5.5.3, if a fission product contributes less than 0.1% of the total activity and an actinide contributes less than 0.01% of the total activity, it is not required to be analyzed, with I-129 as an exception. Calculation 67009-TLAA09 and the associated Appendix 3F follow these guidelines. The calculation has been revised to clarify the wording and has been included as Enclosure 6 of this submittal.

Appendix 3K has been deleted since it is not necessary, as discussed recently with NRC staff. Calculation 67009-TLAA22 (provided with the prior RAI-2 responses), which supports Appendix 3K, is also considered withdrawn from the active application docket.

Comments B, C, D, E, and F Response: These comments relate to the defense-in-depth leakage calculations for the 37PTH and 69BTH DSCs. As these DSCs are leaktight, this analysis is not needed. Therefore, Appendix 3K has been deleted. Cross-references to Appendix 3K in Section 3.5.5.1 and Attachment A, Table A-1 have also been deleted. The supporting calculation (67009-TLAA22) is considered to be withdrawn from the active application docket.

Renewal Application Impact:

Appendix 3K has been deleted and Sections 3.5.5.1 and Attachment A, Table A-1 have been revised as described in the response.