Vogtle PEmails

From: Gleaves, Bill
Sent: Thursday, January 18, 2018 12:13 PM
To: Chamberlain, Amy Christine
Cc: Adam Quarles (AGQUARLE@southernco.com); Vogtle PEmails
Subject: Vogtle LAR-16-030R1 Final RAI 1-18-2018
Attachments: Vogtle LAR-16-030R1 Final RAI 5 Qs 1-18-2018.pdf

Amy,

The attached is a Final RAI that incorporated your feedback on the draft RAIs questions 2 and 3 as follows:

For Question 2, Sub-Question 1.b was removed and the opening paragraph of Question 1 reworded.

For Question 3 the erroneous language was removed ("The staff also notes several other").

I am sending this as final.

Thanks for your feedback on the draft.

Billy
William (Billy) Gleaves
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Billy

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Final Request for Additional Information
VEGP Units 3 and 4 – LAR 16-030R1
Southern Nuclear Operating Co.
Docket No. 52-025 and 52-026

QUESTION 1

Requirement

10 CFR 52.79(a)(3) requires that the FSAR describe the kinds and quantities of radioactive materials expected to be produced in the operation and the means for controlling and limiting radioactive effluents and radiation exposures within the limits set forth in 10 CFR Part 20.

10 CFR 20.1101(b) requires that the licensee use, to the extent practical, procedures and engineering controls based upon sound radiation protection principles to achieve occupational doses and doses to members of the public that are as low as is reasonably achievable (ALARA).

10 CFR 20.1701 requires that licensees use, to the extent practical, process or other engineering controls to control the concentration of radioactive material in air.

SRP Section 12.2 indicates that the description of airborne sources should include a tabulation of the calculated concentrations of radioactive material, by nuclide, for areas normally occupied by operating personnel and that the FSAR should provide the models and parameters used for the calculations.

Issue

In the LAR 16-030, Revision 1, the licensee specifies that the radionuclides Mn-56, Br-84, Br-85, Kr-89, Rb-88, Te-131, Xe-135m, Xe-137, Xe-138, Ba-137m, and Pr-144 are not expected to exist and, hence, not a contributor to the Auxiliary Building Fuel Handling Area airborne activity source term. These radionuclides are considered to be present in very low quantities in the current UFSAR. It is unclear why some of these radionuclides would not be contributors to the airborne activity source term, based on expected SFP inventories and related radionuclides included in the source term. For example, Cs-137 is included in the source term, as would be expected, yet its daughter Ba-137m, which should be in equilibrium is considered to not exist. Similarly, it's unclear why Rb-88 would not be present, when its parent Kr-88 and another isotope of Rb, Rb-86, which is usually less prevalent, is. Please provide clarification or additional details, as appropriate, for the assumptions made in determining the Auxiliary Building Fuel Handling Area airborne activity source term and how it was determined that the above radionuclides are not expected to exist.

QUESTION 2

Requirement

10 CFR 52.79(a)(3) requires that the FSAR contain the kinds and quantities of radioactive materials expected to be produced in the operation and the means for controlling and limiting radioactive effluents and radiation exposures within the limits set forth in 10 CFR Part 20.

10 CFR 20.1101(b) requires that the licensee use, to the extent practical, procedures and engineering controls based upon sound radiation protection principles to achieve occupational

doses and doses to members of the public that are as low as is reasonably achievable (ALARA).

10 CFR 20.1701 requires that licensees use, to the extent practical, process or other engineering controls to control the concentration of radioactive material in air.

SRP Section 12.2 indicates that the description of airborne sources should include a tabulation of the calculated concentrations of radioactive material, by nuclide, for areas normally occupied by operating personnel and that the FSAR should provide the models and parameters used for the calculations.

Issue

In LAR 16-030, Revision 1, the licensee reduces the nominal spent fuel pool purification flow rate from 250 gpm to 200 gpm. In the airborne activity calculations, the licensee specifies that 150 gpm purification flow is assumed. The licensee also made other changes to the parameters and assumptions used for calculating spent fuel pool radioactivity concentrations and fuel handling area airborne radioactivity concentrations as part of the LAR. Staff has the following questions related to the reduced purification flow rate and other changes related to spent fuel pool activity and spent fuel handling area airborne activity:

1. On Page 12 of Enclosure 1, near the bottom of the page, the licensee indicates that lowering the SFS (the abbreviation "SFS" is not defined in the LAR and but is defined in Tier 1 of the UFSAR as the spent fuel pool cooling system) purification flow rate to 150 gpm is conservative and has no adverse effect on the results of the calculation of fuel handling area airborne radioactivity. This statement has no further explanation or technical basis specified and may be inaccurate. Lowering purification flow would be expected to increase SFP activity due to reduced removal rates and therefore result in an increase in potential for airborne activity.

   Please provide clarification or additional information describing how decreasing spent fuel pool purification has no adverse effect on airborne radioactivity. If this statement is inaccurate, please remove it and discuss the impacts that decreasing SFP purification flow has on airborne radioactivity, in conjunction with the other changes in the LAR.

2. The licensee specifies that the dose rates to personnel on the SFP handling machine will remain below 2.5 mrem/hour specified in the UFSAR. However, the licensee proposed removing information specifying that 2.5 mrem/hour corresponds to an activity level in the water of approximately 0.005 microcurie per gram for the dominant gamma emitting isotopes at the time of refueling (based on UFSAR Table 12.2-8, which provides source terms for components in the SFP purification system, it would appear that the dominant isotopes may be assumed to be Co-58 and Co-60). No source term or other information is provided for the spent fuel pool water to support the statement that the dose on the SFP handling machine will remain below 2.5 mrem/hour nor is the dose contribution from the water to operators on the spent fuel handling machine discussed. In addition to providing information on the dose to an operator during refueling, the SFP water is also a necessary input to the airborne activity calculations in the fuel handling area. Please provide the new spent fuel pool water source term and the methods used to calculate said source term and specify if there are any significant dose increases to operators on the spent fuel handling machine platform or area during refueling.

3. During the audit, it was determined that the revised spent fuel pool water activity was based on the advanced first core RCS source term, which is a lower source term than the design basis RCS source term provided in UFSAR Table 11.1-2. Please justify why it is appropriate

to base the fuel handling area airborne activity calculations, fuel handling area ventilation design, and doses from the spent fuel pool water on the advanced first core RCS source term or revise the calculations based on the source term in UFSAR 11.1-2. If an RCS source term other than that provided in UFSAR Table 11.1-2 is being used, update the UFSAR, as appropriate, to document the alternative source term being used.

QUESTION 3

Requirement

10 CFR 52.79(a)(3) requires that the FSAR contain the kinds and quantities of radioactive materials expected to be produced in the operation and the means for controlling and limiting radioactive effluents and radiation exposures within the limits set forth in 10 CFR Part 20.

10 CFR 20.1101(b) requires that the licensee use, to the extent practical, procedures and engineering controls based upon sound radiation protection principles to achieve occupational doses and doses to members of the public that are as low as is reasonably achievable (ALARA).

10 CFR 20.1701 requires that licensees use, to the extent practical, process or other engineering controls to control the concentration of radioactive material in air.

SRP Section 12.2 indicates that the description of airborne sources should include a tabulation of the calculated concentrations of radioactive material, by nuclide, for areas normally occupied by operating personnel and that the FSAR should provide the models and parameters used for the calculations.

Issue

With respect to Auxiliary Building airborne radioactivity concentrations the staff notes that using the information provided in LAR 16-030, Revision 1, and methodology provided in the UFSAR, the staff calculates Auxiliary Building airborne radioactivity concentrations for numerous radionuclides over twice as high as what is provided in DCD Table 12.2-27. As part of the audit on this LAR, the licensee explained that while the UFSAR revision to Table 12.2-26, indicates that the primary coolant leakage rate to the Auxiliary Building is 296 lb/day (1.554 grams/second), the value actually used to calculate the airborne activity concentrations in the Auxiliary Building is 0.715 grams/second. The value of 0.715 grams/second is derived based on the assumption that some of the leakage is from sampling and handling activities, which is assumed to be at a lower concentration than the design basis RCS source term. The assumptions made for leakage are more conservative than in the UFSAR and the staff finds them acceptable, however, prior to the LAR, Table 12.2-26 provided sufficient information to calculate the airborne activity concentrations provided in UFSAR Table 12.2-27. Therefore, please update UFSAR Table 12.2-26, so that it provides all the appropriate input parameters to calculate the airborne activities in the Auxiliary Building (i.e. update Table 12.2-26 to explain that although the leakage is assumed to be 1.554 grams/second, the value used to calculate airborne activity is 0.715 grams/second, and explain how the value was derived).

QUESTION 4

Requirement

10 CFR 52.79(a)(3) requires that the FSAR contain the kinds and quantities of radioactive materials expected to be produced in the operation and the means for controlling and limiting radioactive effluents and radiation exposures within the limits set forth in 10 CFR Part 20.

10 CFR 20.1101(b) requires that the licensee use, to the extent practical, procedures and engineering controls based upon sound radiation protection principles to achieve occupational doses and doses to members of the public that are as low as is reasonably achievable (ALARA).

10 CFR 20.1701 requires that licensees use, to the extent practical, process or other engineering controls to control the concentration of radioactive material in air.

SRP Section 12.2 indicates that the description of airborne sources should include a tabulation of the calculated concentrations of radioactive material, by nuclide, for areas normally occupied by operating personnel and that the FSAR should provide the models and parameters used for the calculations.

Issue

Staff has the following questions regarding the revisions to UFSAR Table 12.2-26 made in LAR 16-030, Revision 1.

1. The Auxiliary Building and Annex Building HVAC system, shown in UFSAR Figure 9.4.3-1 (Sheet 2 of 3), is made up of three channels. All three channels separate after a common intake and then rejoin at a common exhaust point. Channel 1 (monitored by radiation monitor VAS-RE-002) serves much of the Auxiliary Building controlled area, channel 2 (monitored by radiation monitor VAS-RE-003) serves the remainder of the Auxiliary Building controlled area, and channel 3 (monitored by radiation monitor VAS-RE-008), serves radiologically controlled portions of the Annex Building (note that the fuel handling area HVAC system serves the fuel handling area and other associated areas not covered by the Auxiliary Building and Annex Building HVAC system).

   Prior to the LAR, Note 1 in Table 12.2-26 specified that the Auxiliary Building Airborne Radioactivity Concentrations were calculated without considering the Annex Building exhaust flow. However, in the LAR, Note 1 is revised and specifies that only the Annex Building Exhaust flow from rooms 40357 (containment access corridor), 40551 (containment air filtration exhaust room A), and 40552 (containment air filtration exhaust room B) is excluded. In reviewing UFSAR Figure 9.4.3-1 (Sheet 2 of 3), it clarifies that the portion of the system in the Annex Building (channel 3) also includes the radwaste building access corridor, corridor (unnamed), and the staging and storage area, which are all located in the Annex Building.

   a. Please explain why Table 12.2-26, which provides the input parameters to calculate Auxiliary Building airborne activity, specifically excludes Annex Building rooms 40357, 40551, and 40552, but does not exclude the radwaste building access corridor, corridor (unnamed), and the staging and storage area, which are all in the Annex Building and in the same line. If portions of the Annex Building are being considered in the Auxiliary Building airborne activity calculations please justify why they are being included.

b. The “free air volume” for the Auxiliary Building in Table 12.2-26 is increased in the LAR. The text of the LAR states that, this change is the result of calculations completed during design finalization activities using final as-designed structural information for the Auxiliary Building. Please clarify if the new “free air volume” now includes some of the Annex Building air volume, since the exhaust flow included in the table appears to account for some areas of the Annex Building. If the volume does include some of the Annex Building areas, explain which portions of the Annex Building are included and why.

2. Table 12.2-26 provides a flashing fraction for noble gases of 1 and other gases of 0.1. Please clarify if “other gases” is referring to all other particulates and halogens discussed in Table 12.2-27. Revise Table 12.2-26, as appropriate and justify the use of the 0.1 value. Also explain what flashing fraction is being used for tritium and justify its use.

QUESTION 5

Requirement

In review of LAR 16-30 R1, the staff observes the changes to the radionuclide specific maximum airborne radioactivity concentrations in the auxiliary building. Specifically the staff notes a change to the assumed primary coolant leakage to the auxiliary building. This change results in an increased leakage rate to 296 lb/day from the originally described 20 lb/day in UFSAR Section 12.2, Table 12.2-26. The staff’s concern is that the increased primary coolant leakage assumption is not completely described by the licensee and that methods for controlling releases of radioactive material need to be described for 10 CFR Part 20 and 10 CFR Part 50 Appendix I limits.

Issue

Based on the information provided in the subsection titled “Auxiliary Building Airborne Radioactivity Concentration Calculation Input Parameter Changes,” the staff is unable to verify if there are anticipated changes to Chapter 11,”Radioactive Waste Management,” as a result of the updated assumptions provided to the primary coolant leakage rate into the auxiliary building. The licensee states on page 16 of enclosure 1 that: “During normal operation, the dose from concentrations of airborne radioactive material in unrestricted areas beyond the site boundary is ALARA and within the limits specified in 10 CFR Part 20 and 10 CFR Part 50, Appendix I.” In review of the information contained in chapter 11 the staff references NUREG-0017, Rev 1, as describing a 160 lb/day primary coolant leakage rate for use in determining the normal operations source term. This source term is subsequently used to demonstrate compliance with 10 CFR Part 20, Appendix B, effluent concentration limits, and 10 CFR Part 50, Appendix I, dose objectives.

The staff requests the following information:

1. Given the information contained in chapter 11 are based on a 160 lb/day primary coolant leakage rate to the auxiliary building, how is the licensee addressing the increased leakage rate assumption for normal effluent releases to ensure that requirements in 10 CFR Part 20 and 10 CFR Part 50, Appendix I will be met?

2. Describe the assumed changes to the calculated releases for providing reasonable assurance that the 10 CFR Part 50, Appendix I, dose objectives continue to be met.

3. The licensee has not described any monitoring or programs that would be leveraged to ensure 10 CFR Part 20 and 10 CFR Part 50, Appendix I, requirements are met. Please explain how the licensee will ensure compliance with 10 CFR Part 20 and 10 CFR Part 50, Appendix I via monitoring or some other means.

<END>