Vogtle PEmails

From: Gleaves, Bill
Sent: Wednesday, October 25, 2017 7:31 AM
To: Chamberlain, Amy Christine
Cc: Adam Quarles (AGQUARLE@southernco.com); Patel, Chandu; Dixon-Herrity, Jennifer; Vogtle PEmails; Stutzcage, Edward; Burkhart, Lawrence
Subject: Draft RAI on Vogtle LAR-030, Rev 1, "Ventilation System Changes"
Attachments: Vogtle LAR-16-030R1 Draft RAI on Ventilation System Changes 10-25-17.pdf

Amy,

Attached is a Draft RAI on the subject LAR. This draft RAI has been approved by both the technical and licensing Division Directors per our standard procedure. Please review and accept or request clarification.

Respectfully

Billy
William (Billy) Gleaves
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Licensing Branch 4
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From: Gleaves, Bill

Created By: Bill.Gleaves@nrc.gov

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Draft RAI for Vogtle LAR-16-030, Rev 1, "Ventilation System Changes"

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. Staff has the following questions related to the reduced purification flow rate:

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 does not appear to be defined in the UFSAR, but staff assumes that it stands for spent fuel pool) 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.

    a. 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.

    b. Please define the abbreviation SFS, or correct, as appropriate.

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.

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

LAR 16-030 is unclear regarding the ventilation exhaust flow from the VAS Fuel handling area HVAC Subsystem.

UFSAR Figure 9.4.3-1 (Sheet 3 of 3) shows that the VAS Fuel Handling area HVAC Subsystem serves the fuel handling area, rail car bay/filter storage area, resin transfer pump/valve room, spent resin tank room, waste disposal container area, WSS Valve/piping area, and elevator machine room.

Page 11 of 24 of the LAR, Enclosure 1, states that, “The total nominal design exhaust ventilation flow rate through the auxiliary building fuel handling and rail car bay/solid radwaste system areas is decreased to 11,900 cfm. The nominal design exhaust ventilation flow rate through the fuel handling area is defined as the sum of the fuel handling area exhaust flow from Room 12562 and exhaust flow from Room 12562 to Room 12471, which excludes the rail car bay/solid radwaste system exhaust flow, of 9,500 cfm.”

The revised UFSAR Table 12.2-24 in the LAR specifies that the ventilation flow through the fuel handling area is 9,500 cfm and note 1 specifies that, “this flow rate is defined as the sum of the fuel handling area exhaust flow from room 12562 (fuel handling area) and exhaust flow from room 12562 to room 12471 (solid radwaste system valve/piping area).”

Please clarify what the exhaust flow rate from the rail car bay area is and better explain the airflow pattern through the VAS Fuel Handling area HVAC Subsystem and potential impacts on dose.

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

With respect to Auxiliary Building airborne radioactivity concentrations, please explain and demonstrate how the Cs-137 value in the revised UFSAR Table 12.2-27 was calculated. 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 the revised UFSAR Table 12.2-27. Please provide additional justification for the calculated values.

QUESTION 5:

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 2 questions regarding the revisions to UFSAR Table 12.2-26 made in LAR 16-030, Revision 1:

1. Originally, 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, 40551, and 40552 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 also includes other Annex Building areas such as the radwaste building access corridor and the staging and storage area. The subsystem for the Auxiliary Building and Annex Building appear to be independent except for a common intake and release point.

   a. Please explain why some portions of the Annex Building are now included in the Auxiliary Building airborne activity calculations and possible impacts on the dose.

   b. Also discuss how it was determined which areas of the Annex Building would be included in the Auxiliary Building Airborne Activity Calculations.

   c. 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.

2. Table 12.2-26 provides a flashing fraction for noble gas 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.

QUESTION 6:

Requirement

GDC 60 control of releases of radioactive material.

Issue

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.

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.

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.

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.