

Southern Nuclear Operating Company

ND-19-1023

Enclosure 7

Vogtle Electric Generating Plant (VEGP) Units 3 and 4

**Response to Draft Request for Additional
Information (LAR-19-005R1)**

(Enclosure 7 consists of 9 pages, including this cover page)

Response to Draft Requests for Additional Information

The NRC issued three DRAFT Requests for Additional Information (RAIs) related to Southern Nuclear Operating Company's (SNC's) License Amendment Request (LAR) 2019-005. The RAIs were issued on July 9, 2019, August 1, 2019 and September 10, 2019 and were individually discussed during public meetings on July 10, 2019, August 15, 2019 and September 12, 2019.

The RAIs are copied in their entirety followed by SNC's response to the requested clarification and questions.

DRAFT

Request for Additional Information

Vogtle Nuclear Site, Units 3 and 4, Dockets 52-0025 and 52-0026

Southern Nuclear Operating Co.

Docket Nos. 52-0025 and 52-0026

Section: 14.03.08 - Radiation Protection Inspections, Tests, Analyses, and Acceptance Criteria

Application Section: Tier 1

[July 9, 2019]

Background

In LAR-19-005, the licensee requests changes to COL Appendix C and Tier 1, Table 3.3-1, "Definition of Wall Thicknesses for Nuclear Island Buildings, Turbine Building, and Annex Building," and Table 3.3-6, "Inspections, Tests, Analyses, and Acceptance Criteria." The proposed changes include the allowance of construction deviations from the thicknesses of radiation shielding barriers in the nuclear island structures and annex building if the changes can be made without a "loss of shielding function."

Issue

The proposed wording in Table 3.3-1, Footnotes 15 and 16 and the Table 3.3-6 ITAAC acceptance criteria for ITAAC 3.3.00.02a.i.a, 3.3.00.02a.i.b, 3.3.00.02a.i.c, 3.3.00.02a.i.d, 3.3.00.02a.ii.e, and 3.3.00.04b, are not clear. The proposed language does not specify if the radiation attenuation factor is reduced (or otherwise clarify whether an acceptable level of radiation attenuation is retained). Specifically, it is unclear to the staff what amount of radiation shielding reduction (and resulting radiation attenuation loss) can be made without being considered a loss in radiation shielding function. In addition, the radiological dose impacts and consequences of changes in radiation barrier thickness vary based on the radiation source and the dose reduction needs on the other side of the barrier. The staff is concerned that the current language will allow reductions in radiation attenuation that may not be acceptable without adding concrete density or by adding an additional shielding material to the wall.

Clarification

Please clarify or revise, as appropriate, the Table 3.3-1, Footnotes 15 and 16 and the acceptance criteria for ITAAC 3.3.00.02a.i.a, 3.3.00.02a.i.b, 3.3.00.02a.i.c, 3.3.00.02a.i.d, 3.3.00.02a.ii.e, and 3.3.00.04b, in Table 3.3-6 to provide a criteria which ensures that radiation attenuation remains appropriate and the facility has been constructed and will be operated in accordance with the design and the relevant requirements.

Regulatory Basis

10 CFR 50, Appendix A, General Design Criteria (GDC) 61, requires that the fuel storage and handling, radioactive waste, and other systems which may contain radioactivity shall be designed to assure adequate safety under normal and postulated accident conditions. These systems shall be designed (1) with a capability to permit appropriate periodic inspection and testing of components important to safety (2) with suitable shielding for radiation protection, and (3) with appropriate containment, confinement, and filtering systems.

10 CFR 52.80(a) requires that the application must contain the proposed inspections, tests, and analyses, that the licensee shall perform, and the acceptance criteria that are necessary and sufficient to provide reasonable assurance that, if the inspections, tests, and analyses are performed and the acceptance criteria met, the facility has been constructed and will be operated in conformity with the combined license, the provisions of the Act, and the Commission's rules and regulations.

DRAFT

Request for Additional Information

Vogtle Nuclear Site, Units 3 and 4, Dockets 52-0025 and 52-0026

Southern Nuclear Operating Co.

Docket Nos. 52-0025 and 52-0026

Section: 14.03.08 - Radiation Protection Inspections, Tests, Analyses, and Acceptance Criteria

Application Section: Tier 1

[August 1, 2019]

Background

In LAR-19-005, the licensee requests changes to COL Appendix C and Tier 1, Table 3.3-1, "Definition of Wall Thicknesses for Nuclear Island Buildings, Turbine Building, and Annex Building," and Table 3.3-6, "Inspections, Tests, Analyses, and Acceptance Criteria." The proposed changes include the allowance of construction deviations from the thicknesses of radiation shielding barriers and the structural wall thickness in the nuclear island structures and annex building, if the changes can be made without a "loss of shielding function" and the structures will withstand design bases loads without loss of structural integrity or safety-related function.

Issue

The proposed wording in Table 3.3-1, Footnotes 15, 16, and 17, and the Table 3.3-6 ITAAC acceptance criteria for ITAAC 3.3.00.02a.i.a, 3.3.00.02a.i.b, 3.3.00.02a.i.c, 3.3.00.02a.i.d, 3.3.00.02a.ii.e, 3.3.00.02a.ii.f, and 3.3.00.04b do not provide the clarity needed to assure that the proposed changes are designed and implemented consistently. As currently proposed, the criteria for “loss of shielding function” are unclear with regards to radiation shielding functionality and aggregate impacts (e.g., occupational dose, public dose, environmental qualification, SSC degradation, control room dose, vital area doses, and, as applicable, equipment survivability). Additionally, the methodologies should be consistent with those used in the design certification. Similarly, for structures the criteria to assess the resulting structural integrity is unclear and it is indeterminate whether the applicant’s proposal accounts for the global impacts of all proposed changes so that the changes do not result in a loss of structural integrity or safety-related functions.

The footnotes and associated ITAAC acceptance criteria should clearly define the radiation shielding functional requirements to be met when the licensee deviates from the thicknesses and tolerances that are currently in Table 3.3-1.

For the structural reconciliation of construction deviations mentioned in footnotes 15, 16, and 17 of the LAR enclosure 3, the staff is unclear about the bases used to justify deviations from the Tier 1 values, including details on the evaluation method and acceptance criteria. The staff did not find the supporting information in Tier 2 that provides the methodology to be used; nor did the staff find the associated acceptance criteria.

Question

Please clarify or revise, as appropriate, the Table 3.3-1 Footnotes 15, 16, and 17 and the acceptance criteria for ITAAC 3.3.00.02a.i.a, 3.3.00.02a.i.b, 3.3.00.02a.i.c, 3.3.00.02a.i.d, 3.3.00.02a.ii.e, 3.3.00.02a.ii.f, and 3.3.00.04b in Table 3.3-6 to provide criteria that ensures that radiation shielding function and structural integrity remain appropriate and the facility has been constructed and will be operated in accordance with the design and all relevant requirements.

Regulatory Basis

10 CFR Part 50, Appendix A, General Design Criterion (GDC) 2, “Design Bases for Protection against Natural Phenomena,” requires that SSCs important to safety shall be designed to withstand the effects of natural phenomena such as earthquakes, tornadoes, hurricanes, floods, tsunamis, and seiches without loss of capability to perform their safety functions.

GDC 4, “Environmental and Dynamic Effects Design Bases,” requires that SSCs important to safety shall be designed to accommodate the effects of and to be compatible with the environmental conditions associated with normal operation, maintenance, testing and postulated accidents, including loss-of-coolant accidents.

GDC 61, requires that the fuel storage and handling, radioactive waste, and other systems which may contain radioactivity shall be designed to assure adequate safety under normal and

postulated accident conditions. These systems shall be designed (1) with a capability to permit appropriate periodic inspection and testing of components important to safety (2) with suitable shielding for radiation protection, and (3) with appropriate containment, confinement, and filtering systems.

10 CFR 52.80(a) requires that the application must contain the proposed inspections, tests, and analyses, that the licensee shall perform, and the acceptance criteria that are necessary and sufficient to provide reasonable assurance that, if the inspections, tests, and analyses are performed and the acceptance criteria met, the facility has been constructed and will be operated in conformity with the combined license, the provisions of the Act, and the Commission's rules and regulations.

Draft Request for Additional Information

Vogtle Nuclear Site, Units 3 and 4, Dockets 52-0025 and 52-0026

Southern Nuclear Operating Co.

Docket Nos. 52-0025 and 52-0026

Section: 14.03.08 - Radiation Protection Inspections, Tests, Analyses, and Acceptance Criteria

Application Section: Tier 1

September 5, 2019

Background

In LAR-19-005, the licensee requests changes to COL Appendix C and Tier 1, Table 3.3-1, "Definition of Wall Thicknesses for Nuclear Island Buildings, Turbine Building, and Annex Building," and Table 3.3-6, "Inspections, Tests, Analyses, and Acceptance Criteria." The proposed changes include the allowance of construction deviations from the thicknesses of radiation shielding barriers and the structural wall thickness in the nuclear island structures and annex building, if the changes "conform to the approved design and will withstand the design basis loads specified in the Design Description without loss of structural integrity or the safety-related functions, and that there is no loss of the shielding function."

Issue

At this time, the proposed changes lack clarity regarding how non-conformances and deviations (N&Ds) from Table 3.3-1 will be evaluated to ensure the changes "conform to the approved design and will withstand the design basis loads specified in the Design Description without loss of structural integrity or the safety-related functions, and that there is no loss of the shielding function."

Question

Please clarify that N&Ds from the thicknesses and tolerances specified in Table 3.3-1 (i.e. out of tolerance conditions) are addressed under the 10 CFR Part 50, Appendix B process and subsequently are screened in accordance with the 10 CFR Part 52, Appendix D, Section VIII process or a 10 CFR 50.59-like process, to ensure that the licensing basis is adequately maintained. Please provide revised text to clarify how these processes will be implemented.

In addition, the language in VEGP UFSAR Tier 1, Table 3.3-6, appears to conflict with the stated purposes of radiation shielding (for normal operation and post-accident conditions) as described in several sections of the Tier 2 UFSAR and the resulting numerical values in Tier 1, Table 3.3-1. Please provide revised UFSAR Tier 1 text to resolve any discrepancies between the proposed changes and the existing statements in UFSAR Tier 1, Table 3.3-6, Acceptance Criteria, and UFSAR Tier 2.

Regulatory Basis

10 CFR Part 50, Appendix A, General Design Criterion (GDC) 2, "Design Bases for Protection against Natural Phenomena," requires that SSCs important to safety shall be designed to withstand the effects of natural phenomena such as earthquakes, tornadoes, hurricanes, floods, tsunamis, and seiches without loss of capability to perform their safety functions. GDC 2 further requires that "[t]he design bases for these structures, systems, and components shall reflect: (1) Appropriate consideration of the most severe of the natural phenomena that have been historically reported for the site and surrounding area, with sufficient margin for the limited accuracy, quantity, and period of time in which the historical data have been accumulated, (2) appropriate combinations of the effects of normal and accident conditions with the effects of the natural phenomena and (3) the importance of the safety function to be performed."

10 CFR Part 52, Appendix D, Section VIII, "Processes for Changes and Departures," describes the process for changes to various Tiers of information in COLs referencing Part 52, Appendix D.

GDC 4, "Environmental and Dynamic Effects Design Bases," requires that structures, systems, and components important to safety shall be designed to accommodate the effects of and to be compatible with the environmental conditions associated with normal operation, maintenance, testing, and postulated accidents, including loss-of-coolant accidents. These structures, systems, and components shall be appropriately protected against dynamic effects, including the effects of missiles, pipe whipping, and discharging fluids, that may result from equipment failures and from events and conditions outside the nuclear power unit. However, dynamic effects associated with postulated pipe ruptures in nuclear power units may be excluded from the design basis when analyses reviewed and approved by the Commission demonstrate that the probability of fluid system piping rupture is extremely low under conditions consistent with the design basis for the piping.

GDC 19, "Control room," requires a control room be provided from which actions can be taken to operate the nuclear power unit safely under normal conditions and to maintain it in a safe condition under accident conditions, including loss-of-coolant accidents. Adequate radiation protection shall be provided to permit access and occupancy of the control room under accident conditions without personnel receiving radiation exposures in excess of 5 rem whole body, or its equivalent to any part of the body, for the duration of the accident. Equipment at appropriate locations outside the control room shall be provided (1) with a design capability for prompt hot shutdown of the reactor, including necessary instrumentation and controls to maintain the unit in a safe condition during hot shutdown, and (2) with a potential capability for subsequent cold shutdown of the reactor through the use of suitable procedures.

GDC 61, "Fuel storage and handling and radioactivity control," requires, in part, that the fuel storage and handling, radioactive waste, and other systems which may contain radioactivity shall be designed to assure adequate safety under normal and postulated accident conditions, including suitable shielding for radiation protection.

10 CFR 52.80(a) requires, in the relevant part, that the application must contain the proposed inspections, tests, and analyses that the licensee shall perform, and the acceptance criteria that are necessary and sufficient to provide reasonable assurance that, if the inspections, tests, and analyses are performed and the acceptance criteria met, the facility has been constructed and will be operated in conformity with the combined license, the provisions of the Act, and the Commission's rules and regulations.

SNC Responses

Clarification

Please clarify or revise, as appropriate, the Table 3.3-1, Footnotes 15 and 16 and the acceptance criteria for ITAAC 3.3.00.02a.i.a, 3.3.00.02a.i.b, 3.3.00.02a.i.c, 3.3.00.02a.i.d, 3.3.00.02a.ii.e, and 3.3.00.04b, in Table 3.3-6 to provide a criteria which ensures that radiation attenuation remains appropriate and the facility has been constructed and will be operated in accordance with the design and the relevant requirements.

Response

SNC is revising the license amendment request enclosed in letter SNC letter number ND-19-0162 dated March 29, 2019 (Accession No. ML19088A274). The revision provides clarifications to the previously proposed ITAAC acceptance criteria and the generic notes to Table 3.3-1 to provide assurance that the facility has been constructed and will be operated in accordance with the design and the relevant requirements. The revised ITAAC specifies that the acceptance criteria for ITAAC 3.3.00.02a.i.a, 3.3.00.02a.i.b, 3.3.00.02a.i.c, 3.3.00.02a.i.d, 3.3.00.02a.ii.e, and 3.3.00.04b in Table 3.3-6 includes the phrase "without impacting compliance with the radiation protection licensing basis."

The revised acceptance criteria will require SNC to demonstrate that radiological zoning and equipment qualification requirements are met, by establishing acceptance criteria that encompasses radiation shielding functionality and aggregate impacts (i.e., occupational and public dose, environmental qualification) and is consistent with the Tier 2 design criteria (e.g., UFSAR sections 3.11.4 "Estimated Radiation and Chemical Environment," 3D.5.1.2 "Radiation Dose," and 12.3.2.1 "Shielding, Design Objectives").

Question

Please clarify or revise, as appropriate, the Table 3.3-1 Footnotes 15, 16, and 17 and the acceptance criteria for ITAAC 3.3.00.02a.i.a, 3.3.00.02a.i.b, 3.3.00.02a.i.c, 3.3.00.02a.i.d, 3.3.00.02a.ii.e, 3.3.00.02a.ii.f, and 3.3.00.04b in Table 3.3-6 to provide criteria that ensures that

radiation shielding function and structural integrity remain appropriate and the facility has been constructed and will be operated in accordance with the design and all relevant requirements.

Response

As noted in the response to the clarification (above), SNC is revising the ITAAC acceptance criteria to demonstrate there is no impact to compliance with the radiation protection licensing basis, by establishing clarifying notes that encompass GDC 19, established radiological zoning and equipment qualification and is consistent with the Tier 2 design criteria (e.g., UFSAR Subsections 3.11.4 "Estimated Radiation and Chemical Environment," 3D.5.1.2 "Radiation Dose," and 12.3.2.1 "Shielding, Design Objectives").

Regarding the criteria to assess structural integrity, the proposed changes in the LAR will require future structural deviations be evaluated to existing design requirements and will continue to satisfy Tier 2 design criteria. Deviations that could potentially affect the design functions of structural buildings or alter compliance with applicable design codes or licensing basis requirements will continue to be evaluated and dispositioned under the 10 CFR 52 Appendix D Section VIII process, as supplemented by License Condition 2.D(13). As noted in the amendment request, structural deviations will continue to comply with applicable concrete and structural codes as defined in the licensing basis. Specifically, the requirements that seismic Category I and II structures comply with applicable design codes, including ACI 349-01 and ANSI/AISC N690-94 will continue to be met. Supplemental Tier 2 requirements described in UFSAR Subsection 3.8.4.4.1, "Seismic Category I Structures," UFSAR Subsection 3.8.4.5, "Structural Criteria," and the guidance contained in NRC Regulatory Guides 1.69, 1.115, 1.142, and 1.143 as discussed in UFSAR Appendix 1A, "Conformance with Regulatory Guides will also be met.

Question

Please clarify that N&Ds from the thicknesses and tolerances specified in Table 3.3-1 (i.e. out of tolerance conditions) are addressed under the 10 CFR Part 50, Appendix B process and subsequently are screened in accordance with the 10 CFR Part 52, Appendix D, Section VIII process or a 10 CFR 50.59-like process, to ensure that the licensing basis is adequately maintained. Please provide revised text to clarify how these processes will be implemented.

In addition, the language in VEGP UFSAR Tier 1, Table 3.3-6, appears to conflict with the stated purposes of radiation shielding (for normal operation and post-accident conditions) as described in several sections of the Tier 2 UFSAR and the resulting numerical values in Tier 1, Table 3.3-1. Please provide revised UFSAR Tier 1 text to resolve any discrepancies between the proposed changes and the existing statements in UFSAR Tier 1, Table 3.3-6, Acceptance Criteria, and UFSAR Tier 2.

Response

SNC is proposing to add an additional note to COL, Appendix C Table 3.3-1 to specify that nonconformances from the thicknesses and tolerances specified in Table 3.3-1 (i.e. out of tolerance conditions) will be addressed under the 10 CFR Part 50, Appendix B process and

subsequently are screened in accordance with the 10 CFR Part 52, Appendix D, Section VIII process, to ensure that the licensing basis is adequately maintained. The additional note will also specify that construction deviations will be consistent with the licensing basis and will be addressed in accordance with licensee procedures and regulatory requirements and, if applicable, a license amendment will be obtained prior to implementation of the change.

Regarding the conflict with the stated purposes for radiation shielding (i.e., normal operation and post-accident conditions), the proposed changes in the LAR will continue to require that all nonconformances be reviewed and evaluated for all impacts to licensing basis requirements. For nonconformance's in wall thicknesses, this includes reviewing and verify that all radiation shielding requirements in the VEGP 3 and 4 UFSAR are met including normal and post-accident conditions.