



UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

SAFETY EVALUATION BY THE OFFICE OF NEW REACTORS
RELATED TO AMENDMENT NOS. 137 AND 136
TO COMBINED OPERATING LICENSE
NOS. NPF-91 AND NPF-92, RESPECTIVELY
SOUTHERN NUCLEAR OPERATING COMPANY, INC.
GEORGIA POWER COMPANY
OGLETHORPE POWER CORPORATION
MEAG POWER SPVM, LLC
MEAG POWER SPVJ, LLC
MEAG POWER SPVP, LLC
CITY OF DALTON, GEORGIA
VOGTLE ELECTRIC GENERATING PLANT, UNITS 3 AND 4
DOCKET NOS. 52-025 AND 52-026

1.0 INTRODUCTION

By letter dated April 13, 2018 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML18103A249), the Southern Nuclear Operating Company (SNC) requested that the U.S. Nuclear Regulatory Commission (NRC) amend Vogtle Electric Generating Plant (VEGP) Units 3 and 4, Combined License (COL) Numbers NPF-91 and NPF-92, respectively.

The License Amendment Request (LAR) 18-012 requested changes to the plant-specific Appendix A, Technical Specifications (TS) as incorporated into the VEGP Units 3 and 4 COL, and changes to the approved AP1000 Design Control Document (DCD) Tier 2 information as incorporated into the Updated Final Safety Analysis Report (UFSAR). Specifically, the amendment includes changes to the COL Appendix A, TS related to the status of the remotely operated containment isolation valves. There are two changes to the licensing basis documents that are proposed in this LAR. The first change is to clarify the post-accident monitoring (PAM) category designation for containment isolation valves statuses by explicitly stating in the licensing basis to avoid confusion and a potential human factors error and to allow operators to quickly verify that the nonessential containment flow paths are isolated and then focus on the availability of the essential flow paths for their defense-in-depth capabilities. The second change is to add PAM requirements for the Normal Residual Heat Removal System (RNS), the

Component Cooling Water System (CCS), and the Chemical and Volume Control System (CVS) containment isolation valve statuses to capture PAM requirements for their valve status not currently identified as being required for PAM in UFSAR Table 7.5-1, "Post-Accident Monitoring System".

2.0 REGULATORY EVALUATION

The LAR proposed changes to COL Appendix A, TS and UFSAR Tier 2 information associated with the statuses of the remotely operated containment isolation valves in the PAM system. The NRC staff considered the following regulatory requirements and guidance in reviewing the proposed LAR:

10 CFR Part 52, Appendix D, Section VIII.B.5.a allows an applicant or licensee who references this appendix to depart from Tier 2 information, without prior NRC approval, unless the proposed departure involves a change to or departure from Tier 1 information, Tier 2* information, or the TS, or requires a license amendment under Paragraphs B.5.b or B.5.c of this section. Because the departures from UFSAR Tier 2 design information proposed in this LAR involve changes to information in COL Appendix A, TS, Table 3.3.17-1, "Post-Accident Monitoring Instrumentation" and thus require prior NRC approval for the UFSAR Tier 2 departures.

Title 10 of the *Code of Federal Regulations* (10 CFR) Part 52, Appendix D, VIII.C.6 states that after issuance of a license, "Changes to the plant specific TS will be treated as license amendments under 10 CFR 50.90." 10 CFR 50.90 addresses the applications for amendments of licenses, construction permits, and early site permits. Because a change to COL Appendix A, TS associated with the PAM system is requested in this LAR, and therefore, an LAR is required.

10 CFR 50.34(f)(2)(xvii) states, in part, that instrumentation shall be provided to measure, record, and readout in the control room: (a) containment pressure, (b) containment water level, (c) containment hydrogen concentration, (d) containment radiation intensity (high level), and (e) noble gas effluents at all potential, accident release points. Changes are proposed in this LAR to be made to UFSAR Tables 7.5-1 and 7.5-7 and TS Table 3.3.17-1 for the PAM system. Therefore, this regulation is applicable to the safety assessment of this LAR.

10 CFR 50.36, TS impose limits, operating conditions, and other requirements upon reactor facility operation for the public health and safety. The TS are derived from the analyses and evaluations in the safety analysis report. In general, TS must contain: (1) safety limits and limiting safety system settings; (2) limiting conditions for operation; (3) surveillance requirements; (4) design features; and (5) administrative controls. So, this regulation is considered for conducting the safety evaluation of this LAR.

10 CFR Part 50, Appendix A, General Design Criterion (GDC) 13, "Instrumentation and Control" requires, in part, that instrumentation shall be provided to monitor variables and systems over their anticipated ranges for normal operation, for anticipated operational occurrences, and for accident conditions as appropriate to assure adequate safety, including those variables and systems that can affect the fission process, the integrity of the reactor core, the reactor coolant pressure boundary, and the containment and its associated systems. Appropriate controls shall be provided to maintain these variables and systems within prescribed operating ranges. This LAR proposed changes to the PAM system and associated COL Appendix A TS, Table 3.3.17-1. Hence, this regulation is applicable to the safety evaluation of this LAR.

10 CFR Part 50 Appendix A, GDC 19, "Control Room" requires, in part, that a control room shall 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. This LAR proposed changes to the PAM system in the main control room (MCR). Therefore, this GDC is applicable to assess this LAR.

10 CFR Part 50 Appendix A, GDC 64, "Monitoring Radioactivity Releases" requires, in part, that means shall be provided for monitoring the reactor containment atmosphere, spaces containing components for recirculation of loss-of-coolant accident fluids, effluent discharge paths, and the plant environs for radioactivity that may be released from normal operations, including anticipated operational occurrences, and from postulated accidents. This LAR proposed to add a new note to UFSAR Table 7.5-1 and TS Table 3.3.17-1 to clarify that the remotely operated containment isolation valve status is limited to components that receive a containment isolation signal (T signal). In addition, "RNS pump discharge isolation valve status," "CCS Containment isolation valve status," and "CVS makeup line containment isolation valve status" are proposed to be added to UFSAR Tables 7.5-1 and 7.5-7 as new PAM variables. Therefore, GDC 64 is applicable to the safety evaluation of this LAR.

Regulatory Guide (RG) 1.97, "Instrumentation for Light-Water-Cooled Nuclear Power Plants to Assess Plant and Environs Conditions During and Following an Accident," Revision 3 used in the certified AP1000 DCD and committed to in UFSAR describes a method acceptable to the NRC staff for complying with the Commission's regulations to provide instrumentation to monitor plant variables and systems during and following an accident in a light-water cooled nuclear power plant. In addition, it is noted in the UFSAR Appendix 1A in referring to RG 1.97, Revision 3 that due to AP1000 specific design features, the selection of some plant-specific variables and their classifications and categories are different from those of RG 1.97. The changes proposed in this LAR are associated with the PAM system, therefore, this RG 1.97 is applicable to the evaluation of this LAR.

3.0 TECHNICAL EVALUATION OF THE REQUESTED CHANGES

In this LAR, the licensee proposed changes to COL Appendix A, TS and UFSAR Tier 2 information associated with the statuses of the remotely operated containment isolation valves in the PAM system. Specifically there are two changes proposed in this LAR:

- Add PAM requirements for the remotely operated containment isolation valve statuses for normal RNS, CCS, and CVS.
- Provide clarification on the PAM category designation for remotely operated containment isolation valves status in Table 7.5-1 of UFSAR.

The specific technical and safety evaluations of the above proposed changes are provided below from different technical perspectives.

3.0.1 INSTRUMENTATION AND CONTROL

The PAM system in the certified AP1000 design provides capability for indication of certain plant variables during accident conditions. The PAM system is designed to provide operators in the MCR with sufficient operational information to achieve and maintain a safe shutdown condition following an accident. The PAM information of the monitored variables is shown in the MCR on the protection and safety monitoring (PMS) safety display subsystem, Plant Control System

workstations, and the Wall Panel Information System. The selection of monitored plant variables and their classifications and categories is made according to the regulatory guidance provided in RG 1.97, Revision 3 and UFSAR Section 7.5. In RG 1.97 and UFSAR Section 7.5, monitored variables are grouped into six kinds of classification. The qualification requirements of instrumentation for each type of accident monitoring variables are subdivided into three categories. In the certified AP1000 design, remotely operated valves are used to isolate containment to minimize radioactive release or support accident mitigation functions when required during an accident event. According to Table 7.5-1 in the UFSAR, the status of those containment isolation valves is required to be available on the PAM system for post-accident monitoring, which is collectively called "Remotely operated containment isolation valve status" with Type/Category of B1 or D2. The individual status signal for each valve shows whether the valve is open or closed.

A majority of the remotely operated containment isolation valves are used to provide isolation function of containment during an accident event. Those valves will close once receiving a containment isolation signal called a T signal in the UFSAR. The T signal is reserved for nonessential fluid system paths from the containment. However, there are some remotely operated containment isolation valves which are included to support the accident mitigation functions of nonsafety-related systems. Those valves will not close on a T signal and may be intentionally opened for extended periods of time following an accident to have the essential flow paths open to provide accident mitigation functions.

However, no specific design information is provided in the UFSAR Table 7.5-1 on which containment isolation valve status should have Type/Category of B1 or D2. So, the licensee proposed to clarify the type and category designation for each remotely operated containment isolation valve status.

In this LAR, the licensee clarified that the status of those remotely operated containment isolation valves on the nonessential fluid system paths, which will be closed on a T signal to provide isolation function, is categorized as B1. The status of remotely operated containment isolation valves on the essential flow paths, which will not close on a T signal in order to support accident mitigation functions, is classified as D2. In the LAR, the licensee listed all specific remotely operated valves which are categorized as either B1 or D2. To implement the proposed changes, the license proposed to add a "Note 13" to UFSAR Table 7.5-1 to clarify that the remotely operated containment isolation valve status applies to components that receive a T signal. In addition, two valves, SGS-PL-V075A/B, which are not containment isolation valves, are conservatively included and also categorized as B1 because these two valves also receive the T signal. Valves SGS-PL-V075A/B are designed in series with containment isolation valves SGS-PL-V074A/B that are functionally equivalent with Valves SGS-PL-V075A/B.

The staff's review and evaluation is that the clarified information in this LAR will provide clear, specific design requirements for each remotely operated isolation valve, such as classification, category, and qualification, which further provides unambiguous information for the design of the PAM system safety display screen and other display screens.

The position status of the remotely operated isolation valves receiving the T signal for containment isolation will be integrated in a single "all closed" indication on the PAM system safety display screen. This screen will be used to determine if all the isolation valves in the nonessential containment penetration flow paths are closed after a T signal is generated. The status of the remotely operated isolation valves on the essential containment flow paths will be

integrated in one nonsafety display screen and will also separately be indicated on the safety display screens within their respective systems.

With the clarified information provided in this LAR, the staff finds that it is clear that each remotely operated isolation valve status should be integrated into the single "all closed" indication on the PAM system safety display screen, or should be integrated on the nonsafety display screen. The staff also finds that such a single "all closed" indication could provide a quicker verification to operators that the nonessential containment flow paths are all isolated when required.

In addition, the staff finds that the separate indications for the status of remotely operated valves would allow operators to focus on the availability of those remotely operated isolation valves on the essential flow paths for the accident mitigation functions. The staff finds that the above clarifications proposed in this LAR would provide clearer indications of the remotely operated isolation valves on both essential and nonessential containment flow paths to avoid confusion on the PAM system and a potential human factors error in the MCR. Therefore, the staff finds that the clarified information proposed in this LAR is acceptable.

In this LAR, the license also proposed to add the remotely operated containment isolation valve statuses for RNS, CCS, and CVS to UFSAR Table 7.5-1 with D2 Type/Category. 10 CFR 50.34(f)(2)(xvii), GDC 13, and 19 requires, in part, that instrumentation shall be provided to measure, record, and readout in the MCR and also monitor variables and systems over their anticipated ranges for accident conditions as appropriate to assure adequate safety. The staff's review and evaluation is that the RNS, CCS, and CVS systems could be used for the accident mitigation functions. The status of their remotely operated containment isolation valves is critical to monitor if those systems are operating or not according to design requirements for each system. Accordingly, the staff has determined that the status indication of their remotely operated isolation valves should be included as part of the PAM system. Therefore, the staff finds that this proposed change acceptable.

In summary, the staff finds that the clarification information proposed to add to UFSAR Table 7.5-1 as a new clarifying note 13 would enable the PAM system to have a clearer, unambiguous indication of the remotely operated isolation valve status on both essential and nonessential containment flow paths for post-accident monitoring, which could avoid confusion on the PAM display system and potential human factors errors in the MCR. The staff also finds the changes proposed to add the containment isolation valve statuses as Type/Category D2 variables for the RNS, CCS, and CVS systems meet the regulatory requirements on instrumentation, record, and readout in the MCR as required in 10 CFR 50.34(f)(2)(xvii), GDC 13, and GDC 19 for the PAM system. The staff further finds that the proposed changes in this LAR meet the regulatory guidance and commitment on the selection of plant-specific variables and their classifications and categories in RG 1.97 and UFSAR Section 7.5 for the PAM system.

Therefore, based on the above review and evaluations, the staff finds that the two proposed changes in this LAR are acceptable.

3.0.2 TECHNICAL SPECIFICATION

As presented in the LAR 18-012 and confirmed by the staff, certain remotely operated valves are used to isolate containment when required during an accident to minimize radioactive release. These containment isolation valves are required to be available for PAM and the valve status for many of these valves is identified in UFSAR Table 7.5-1 as "Remotely operated

containment isolation valve status.” The valve statuses that make up this PAM variable are classified as Category 1 variables.

Two categories of changes are proposed by this LAR to revise the licensing basis documents as summarized below:

- Category change 1 addresses the PAM category designation for containment isolation valves identified in UFSAR Table 7.5-1 and TS Table 3.3.17-1, Item 18, “Penetration Flow Path Remotely Operated Containment Isolation Valve Position,” identified as the Category 1 PAM requirements for valves associated with nonessential containment penetration flow paths systems. Only Class 1E components that receive the containment isolation signal (T signal) are included. This needs to be explicitly stated in the licensing basis to avoid confusion and a potential human factors error, and to allow operators to quickly verify that the nonessential containment flow paths are isolated and then focus on the availability of the essential flow paths for their defense-in-depth capabilities, and therefore the associated changes are acceptable for clarity and safety.
- Category change 2 adds PAM requirements for the RNS, CCS, and CVS containment isolation valve statuses to capture PAM requirements for their valve status not currently identified as being required for PAM in UFSAR Table 7.5-1, since they do not receive the containment isolation signal (T signal). The “RNS pump discharge isolation valve status,” “CCS Containment isolation valve status,” and “CVS makeup line containment isolation valve status” are added as new rows to UFSAR Table 7.5-1, and are consistent with the current rows in the table for other Class 1E valves that provide indication of safety system status (e.g., the demineralized water isolation valve status and the steam generator blowdown isolation valve statuses). Therefore, these changes are acceptable because they provide completeness and clarity.

Limiting Condition for Operation 3.3.17 and TS Table 3.3.17-1, Item 18 requires two channels of valve status per flowpath for the Class 1E Category 1 isolation valves that close on a containment isolation signal (T signal) to be operable during Modes 1, 2, and 3. The Penetration Flow Path Remotely Operated Containment Isolation Valve Position is provided to support verification of containment integrity by confirming that flow paths without accident mitigation function to be open (non-essential) are closed. A Note “d” is added to COL Appendix A, TS Table 3.3.17-1 for Item 18 to clarify that “Penetration Flow Path Remotely Operated Containment Isolation Valve Position” is limited to components that receive an engineered safety feature containment isolation signal (T signal). The staff evaluated this change to TS Table 3.3.17-1 and found that it complies with GDC 64 and is therefore acceptable since it allows operators to quickly verify that the nonessential containment flow paths are isolated.

The staff finds the proposed changes to COL Appendix A TS and UFSAR Tier 2 information requirements described above regarding the PAM containment isolation valves acceptable because they provide clarity, consistency and completeness to the TS and licensing basis in general. In addition, the proposed TS Bases changes are consistent with the TS changes.

3.0.3 CONTAINMENT AND VENTILATION SYSTEMS

The staff has reviewed LAR 18-012, for Remotely Operated Containment Isolation Valve Status, especially the following requested Change 1: Clarification of Category Designation for Containment Isolation Valve Statuses for PAM system by explicitly stating in the licensing basis

to avoid confusion and to allow operators to quickly verify that the nonessential containment flow paths are isolated and then focus on the availability of the essential flow paths for their defense-in-depth capabilities.

The staff has reviewed the classification changes for the containment isolation valves regarding continued applicability of the isolation function. The proposed changes do not adversely affect any function or features used for the prevention and mitigation of accident or their safety analyses. Therefore, the staff found that the change above proposed in this LAR is acceptable.

4.0 STATE CONSULTATION

In accordance with the Commission's regulations in 10 CFR 50.91(b)(2), the Georgia State official was notified of the proposed issuance of the amendment on June 14, 2018. The State official had no comment.

5.0 ENVIRONMENTAL CONSIDERATION

The amendment changes a requirement with respect to installation or use of a facility component located within the restricted area as defined in 10 CFR Part 20, "Standards for Protection Against Radiation." The staff has determined that the amendment involves no significant increase in the amounts, and no significant change in the types, of any effluents that may be released offsite. Also, there is no significant increase in individual or cumulative occupational radiation exposure. The Commission has previously issued a proposed finding that the amendment involves no significant hazards consideration, and there has been no public comment on such finding (dated May 22, 2018 (83 FR 23728)). Accordingly, the amendment meets the eligibility criteria for categorical exclusion set forth in 10 CFR 51.22(c)(9). Under 10 CFR 51.22(b), no environmental impact statement or environmental assessment need be prepared in connection with the issuance of the amendment.

6.0 CONCLUSION

The staff has concluded, based on the considerations discussed in Section 3.0 that there is reasonable assurance that: (1) the health and safety of the public will not be endangered by operation in the proposed manner, (2) there is reasonable assurance that such activities will be conducted in compliance with the Commission's regulations, and (3) the issuance of the amendment will not be inimical to the common defense and security or to the health and safety of the public. Therefore, the staff finds that the changes proposed in this license amendment acceptable.

7.0 REFERENCES

1. Request for License Amendment (LAR 18-012): Remotely Operated Containment Isolation Valve Status, April 13, 2018 (ADAMS Accession No. ML18103A249).
2. Vogtle Units 3 and 4 Updated Final Safety Analysis Report, Revision 6, March 12, 2017 (ADAMS Package Accession No. ML17172A218).
3. AP1000 Design Control Document, Revision 19, June 13, 2011 (ADAMS Accession No. ML11171A500).
4. Combined License NPF-91 for Vogtle Electric Generating Plant Unit 3, Southern Nuclear Operating Company (ADAMS Accession No. ML14100A106).
5. Combined License NPF-92 for Vogtle Electric Generating Plant Unit 4, Southern Nuclear Operating Company (ADAMS Accession No. ML14100A135).
6. Regulatory Guide 1.97. "Instrumentation for Light-Water-Cooled Nuclear Power Plants to Assess Plant and Environs Conditions During and Following an Accident." U.S. Nuclear Regulatory Commission, 1983 (ADAMS Accession No. ML003740282).