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10 CFR 50.90

U.S. Nuclear Regulatory Commission
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Southern Nuclear Operating Company
Vogtle Electric Generating Plant Units 3 and 4
Request for License Amendment:
Reactor Coolant Pump (RCP) Speed Sensor Channel Calibration and Response Time Test Surveillance Requirement Changes (LAR-19-008)

Ladies and Gentlemen:

Pursuant to 10 CFR 52.98(c) and in accordance with 10 CFR 50.90, Southern Nuclear Operating Company (SNC) requests an amendment to the combined licenses (COLs) for Vogtle Electric Generating Plant (VEGP) Units 3 and 4 (License Numbers NPF-91 and NPF-92, respectively). The requested amendment proposes changes to COL Appendix A, Technical Specifications (TS) and the VEGP 3 and 4 Updated Final Safety Analysis Report (UFSAR).

The license amendment request (LAR) proposes changes to the UFSAR and the COL Appendix A TS definition for Channel Calibration to allow a qualitative check (i.e., sensor resistance and insulation resistance tests) as an acceptable means to perform channel calibration for the reactor coolant pump (RCP) speed sensors. An additional change is proposed to the UFSAR to allow the use of a conservatively allocated response time in lieu of measurement for the RCP speed sensors and preamplifiers.

Enclosure 1 provides the description, technical evaluation, regulatory evaluation (including the Significant Hazards Consideration Determination) and environmental considerations for the proposed changes.

Enclosure 2 identifies the requested changes and provides markups depicting the requested changes to the VEGP Units 3 and 4 licensing basis documents.

Enclosure 3 provides the information-only changes to the VEGP Units 3 and 4 Technical Specifications Bases document.

This letter contains no regulatory commitments. This letter has been reviewed and determined not to contain security-related information.

SNC requests NRC staff review and approval of this license amendment request (LAR) no later than November 15, 2019 to support the associated procedure and training updates. Delayed approval of this license amendment could result in a delay in training updates and subsequent

dependent activities. SNC expects to implement the proposed amendment within 30 days of approval of the LAR.

In accordance with 10 CFR 50.91, SNC is notifying the State of Georgia by transmitting a copy of this letter and its enclosures to the designated State Official.

Should you have any questions, please contact Ms. Amy Chamberlain at (205) 992-6361.

I declare under penalty of perjury that the foregoing is true and correct. Executed on the 17th of May 2019.

Respectfully submitted,

Brian H. Whitley
Director, Regulatory Affairs
Southern Nuclear Operating Company

Enclosures
1) Vogtle Electric Generating Plant (VEGP) Units 3 and 4 – Request for License Amendment: Reactor Coolant Pump (RCP) Speed Sensor Channel Calibration and Response Time Test Surveillance Requirement Changes (LAR-19-008)
2) Vogtle Electric Generating Plant (VEGP) Units 3 and 4 – Proposed Changes to Licensing Basis Documents (LAR-19-008)
3) Vogtle Electric Generating Plant (VEGP) Units 3 and 4 – Conforming Changes to the Technical Specifications Bases (For Information Only) (LAR-19-008)

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Southern Nuclear Operating Company

ND-19-0530
Enclosure 1

Vogtle Electric Generating Plant (VEGP) Units 3 and 4

Request for License Amendment: Reactor Coolant Pump (RCP) Speed Sensor Channel Calibration and Response Time Test Surveillance Requirement Changes

(LAR-19-008)

(Enclosure 1 consists of 14 pages, including this cover page.)

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Pursuant to 10 CFR 52.98(c) and in accordance with 10 CFR 50.90, Southern Nuclear Operating Company (SNC) hereby requests an amendment to Combined License (COL) Nos. NPF-91 and NPF-92 for Vogtle Electric Generating Plant (VEGP) Units 3 and 4, respectively.

1. SUMMARY DESCRIPTION

The license amendment request (LAR) would revise the COL Appendix A, Technical Specifications (TS) to allow a qualitative check (i.e., sensor resistance and insulation resistance tests) as an acceptable means to perform channel calibration for the reactor coolant pump (RCP) speed sensors. An additional change is proposed to the Updated Final Safety Analysis Report (UFSAR) to allow the use of a conservatively allocated response time in lieu of measurement for the RCP speed sensors and preamplifiers.

The requested amendment proposes a change to the COL Appendix A, Technical Specification (TS) 1.1 definition of Channel Calibration by identifying RCP speed sensors as instruments that may have calibration performed by an in-place qualitative assessment of the sensor behavior and normal calibration of the remaining adjustable devices in the channel. The requested amendment also proposes a change to UFSAR subsection 7.2.1.1.3 to allow the use of a conservatively allocated response time in lieu of measurement for the RCP speed sensors and preamplifiers. To accompany the change, UFSAR Subsection 7.2.4 is revised to add APP-GW-GLR-804, "AP1000® Technical Report to Support Modification to Response Time and Channel Calibration Testing Requirements for Reactor Coolant Pump Speed," as a secondary reference. This enclosure requests approval of the license amendment necessary to implement these changes.

2. DETAILED DESCRIPTION

As discussed in UFSAR subsection 7.2.1, reactor trip is a protective function performed by the protection and safety monitoring system (PMS) when it anticipates an approach of a parameter to its safety limit. Reactor shutdown occurs when electrical power is removed from the rod drive mechanism coils, allowing the rods to fall by gravity into the reactor core.

The plant protection subsystems maintain surveillance of key process variables directly related to equipment mechanical limitations, and of variables which directly affect the heat transfer capability of the reactor (such as reactor coolant system (RCS) flow). One such trip, the Reactor Trip on Low-2 Reactor Coolant Pump Speed, protects the reactor core from departure from nucleate boiling in the event of a loss of flow in more than one loop. This protection is provided by tripping the reactor when the speed on two out of the four RCPs falls below the setpoint.

The RCPs are each provided with a speed sensor to monitor the rotor revolutions per minute (rpm). One speed sensor is installed on each RCP, in the corresponding steam generator compartment. The sensor detects and measures RCP shaft rotation and converts pump shaft revolutions to output pulses with a pulse frequency proportional to the pump speed.

One preamplifier is provided for each speed sensor. The preamplifier converts the sensor's analog signals into variable frequency Transistor-Transistor Logic (TTL) level signals. The signal from the sensor is passed through the preamplifier and then provided to an input/output module within the Bistable Processor Logic (BPL) system portion of the PMS. The output from the

input/output module is then processed through the comparator in the BPL to determine the partial reactor trip status for the associated reactor trip division.

The Local Coincidence Logic (LCL) system performs the divisional voting logic and other associated logic. Within each division, the LCL reactor trip contact outputs are inputs to two Reactor Trip Matrices (RTMs): one for the Reactor Trip Breaker (RTB) undervoltage (UV) mechanism (coil), and one for the shunt trip (ST) mechanism (coil). The RTMs trip the RTBs by de-energizing the UV coils and energizing the ST coils. Each of the four PMS divisions actuates two reactor trip circuit breakers. The reactor is tripped when the RTBs in two or more divisions are opened.

The PMS performs a continuous self-diagnostic inter-channel comparison on the RCP speed sensor values across all four divisions. The Interface and Test Processor (ITP) module compares the sensor input received from each of the PMS divisions to ensure the sensors in each PMS division are within tolerance. If a predefined number of sensors are out of tolerance, then it will generate an inter-channel check alarm and a division fault alarm.

TS Table 3.3.1-1, Reactor Trip System Instrumentation, requires Reactor Trip on Reactor Coolant Pump (RCP) Speed – Low 2 (Function 9) to be OPERABLE and includes requirements to perform Surveillance Requirements (SRs) for Response Time and Channel Calibration. This Function is included for protection against violating departure from nucleate boiling ratio limit due to loss of flow in two or more Reactor Coolant System (RCS) loops. A Low 2 RCP speed reactor trip will occur if speed decreases below the Low-2 setpoint while the core thermal power exceeds the P-10 (Power Range Neutron Flux) permissive setpoint. Reactor Trip on Low 2 RCP speed is credited in Turbine Trip, Loss of Load and Complete Loss of Forced RCS Flow events. As noted in UFSAR Table 15.0-4a, the assumed channel response time for the reactor trip is 0.65 seconds (i.e., 650 ms).

The design of the RCPs precludes in-situ calibration and response time testing of the RCP speed sensors. Accordingly, current surveillance testing (i.e., Channel Calibration and Response Time testing) of the RCP speed sensors requires removal of the speed sensors at watertight compression and pin connections in order to test the speed sensors in a laboratory setting. Periodic removal of the RCP speed sensor for surveillance testing could lead to early failure of the device due to connection failure from wire fatigue or connector pin damage. Surveillance testing with the sensor installed has challenges as well. The canned induction RCP motor prevents access to any rotating component within the RCP motor. Thus, the inability to monitor RCP speed with a calibrated independent measuring device with the sensor installed prevents the completion of the channel calibration and sensor response time testing Surveillance Requirements.

To prevent early failure of the RCP speed sensors, the channel calibration and sensor response time testing surveillance requirements are proposed to be modified to allow alternative methods for these components.

The proposed change to the RCP speed sensor and preamplifier response time testing requirement and the proposed change to the RCP speed sensor Channel Calibration are independent of each other; however, because the technical justification for both changes rely upon the simplicity and anticipated reliability of the design of the same components (i.e., the RCP speed sensors and preamplifiers), these changes are requested together in this LAR.

Use of Allocated Response Times RCP Speed Sensor and Preamplifier Response Time Tests

The plant-specific Technical Specifications Section 1.1 definition of RTS RESPONSE TIME and the TS Bases (TS 3.3.1 Bases) associated with the RTS RESPONSE TIME Surveillance, provide allowances for the use of allocated response time values in lieu of measurements for the satisfaction of RTS Response Time surveillances, provided NRC approval of the components and methodology for verification is obtained.

The definition of Reactor Trip System (RTS) Response Time from Technical Specification (TS) Section 1.1 states:

> "The RTS RESPONSE TIME shall be that time interval from when the monitored parameter exceeds its RTS trip setpoint at the channel sensor until loss of gripper coil voltage. The response time may be measured by means of any series of sequential, overlapping, or total steps so that the entire response time is measured. In lieu of measurement, response time may be verified for selected components provided that the components and methodology for verification have been previously reviewed and approved by the NRC *[emphasis added].*"

The TS Section 3.3.1 Bases for the Response Time Test Surveillance Requirement also provides that:

> "Response time may be verified by actual response time tests in any series of sequential, overlapping or total channel measurements, or by the summation of allocated sensor, signal processing and actuation logic response times with actual response time tests on the remainder of the channel. Allocations for sensor response times may be obtained from:
>
> (1) historical records based on acceptable response time tests (hydraulic, noise, or power interrupt tests),
>
> (2) in place, onsite, or offsite (e.g. vendor) test measurements, or
>
> (3) utilizing vendor engineering specifications."

Based on this TS definition, and as outlined in the TS Bases, a change is proposed to UFSAR Subsection 7.2.1.1.3 to add a discussion of RCP speed sensor and preamplifier response time allocation, based on the design of these components, and informed by benchmark testing of the sensor/preamplifier components. The requested NRC approval of this change will provide the basis for utilizing this allocation in lieu of measurement when performing the RTS RESPONSE TIME test for the RCP speed sensors.

Use of Qualitative Assessments for RCP Speed Sensor Channel Calibrations

The plant-specific Technical Specifications Section 1.1. definition of CHANNEL CALIBRATION allows for the use of in-place qualitative assessments of the behavior of other sensors (currently, resistance temperature detector (RTD) and thermocouple sensors) together with normal calibration of the remaining adjustable devices in the channel for identified instrument channels to satisfy Channel Calibration surveillance requirements. The definition of Channel Calibration from TS Section 1.1 states:

> "A CHANNEL CALIBRATION shall be the adjustment, as necessary, of the channel output such that it responds within the necessary range and accuracy to known values of the parameter that the channel monitors. The CHANNEL CALIBRATION shall encompass all devices in the channel required for OPERABILITY.
>
> Calibration of instrument channels with resistance temperature detector (RTD) or thermocouple sensors may consist of an inplace qualitative assessment of sensor behavior and normal calibration of the remaining adjustable devices in the channel *[emphasis added]*. The CHANNEL CALIBRATION may be performed by means of any series of sequential, overlapping, or total channel steps."

A change is proposed to revise this TS definition to include RCP speed sensors as additional instrument channel types that may have calibration performed based on qualitative assessment of the sensor behavior.

Licensing Basis Change Descriptions:

The following changes to the VEGP 3 and 4 licensing basis are proposed:

- COL Appendix A Technical Specifications 1.1, "Definitions"

  A change is proposed to modify the definition for Channel Calibration to add "reactor coolant pump speed" to the identified instrument channel types that may use a qualitative assessment as an acceptable means of channel calibration.

- UFSAR Subsection 7.2.1.1.3

  A change is proposed to revise UFSAR subsection 7.2.1.1.3 by adding a discussion of RCP speed sensor and preamplifier response time allocation in lieu of measurement.

- UFSAR Subsection 7.2.4

  A change is proposed to accompany the proposed changes to UFSAR subsection 7.2.1.1.3 by adding APP-GW-GLR-804 as a secondary reference in UFSAR subsection 7.2.4.

The TS Bases (TSB) for RCP speed sensor and preamplifier Channel Calibration (currently TSB SR 3.3.1.8) will be clarified to reflect the allowance for qualitative assessment. The TS Bases for the Reactor Trip System Response Time test Surveillance Requirement (currently TSB SR 3.3.1.11) will be clarified to reflect the allowance for the RCP speed sensor and preamplifier response time to be conservatively allocated in lieu of measurement. The markups showing these changes are provided for information only in Enclosure 3 and will be implemented following NRC approval of this LAR in accordance with the TS 5.5.6, TS Bases Control Program.

3. TECHNICAL EVALUATION

Institute of Electrical and Electronics Engineers (IEEE) Standard 338-1987, as endorsed by Regulatory Guide 1.118, Revision 3, states that Response Time Testing is not required if, in lieu of response time testing, the response time of the safety equipment is verified by functional testing, calibration checks or other tests, and if it can be demonstrated that changes in response time beyond acceptable limits are accompanied by changes in performance characteristics which are detectable during other routine periodic tests. Additionally, the TS definition of Reactor Trip System Response Time provides that "In lieu of measurement, response time may be verified for selected components provided that the components and methodology for verification have been previously reviewed and approved by the NRC."

Variable reluctance speed sensors, such as those used for AP1000 RCP speed sensing, are considered to be very accurate. The variable reluctance speed sensor is a passive device that does not require any external power. For most other sensor types, the sensor response time is dependent on moving parts. For example, pressure sensors convert an applied pressure acting over the surface area of an element (such as a diaphragm) to create a force or movement which is proportional to the pressure. An input transducer then converts pressure to resistance and an output transducer converts resistance to milliamps. In comparison, the variable reluctance speed sensor produces a nearly instantaneous response delayed only by the transit time for the flow of electrical current in the sensor.

The preamplifier also provides a very prompt response compared to the overall channel response time, and this response is not expected to degrade because the preamplifier does not rely on any components that can contribute to changes in the time required for signals to propagate from the sensor through the amplifier.

Both the variable reluctance speed sensor and the preamplifier are anticipated to be highly reliable based on vendor factory testing and the use of a design in which no moving parts are required for their operation. The sensor failure mode with the greatest overall risk factor is loosening of connections (bracket or tube ferrule). The preamplifier failure modes with the greatest overall risk factor are loosened hardware, shorted metal oxide varistors or shorted transient voltage suppression. These failures can be avoided by closely following the instruction manual during installation. If the failure were to occur during operation, it would cause a loss of indication and partial reactor trip signal. The PMS self-diagnostics perform a continuous inter-channel comparison check to look for deviations in signals and would detect this as well as the partial reactor trip, alerting the operators that there is an issue. Other postulated failures would be effectively identified by sensor resistance and insulation resistance testing in the factory. For these reasons, it is recommended that the sensor resistance and insulation resistance tests be performed periodically as part of the Channel Calibration TS Surveillance for RCP speed sensors to satisfy the qualitative assessment of sensor behavior, so that any possible degradation mechanisms would be detected.

A benchmark test program was conducted to obtain the time response of the AP1000 RCP speed sensor and preamplifier. Several test runs were performed at different RCP speed sensor probe positions and different RCP speeds. The test data provided by this test program demonstrated that the output of the RCP speed sensor and preamplifier can be conservatively quantified to be less than 0.5 milliseconds (ms) at the PMS trip actuation setpoint of 91% of rated RCP speed. To ensure the total response time for the RCP speed reactor trip function is less than the

650 milliseconds (ms) assumption used in the safety analysis, the PMS Functional Requirements Specification conservatively allocates 18 ms for the sensor and preamplifier, with the remaining time response allocated to the PMS rack, the reactor trip breaker, electromotive force delay, and margin. Therefore, the test data demonstrates significant conservatism (orders of magnitude) to the safety analysis allocated response time for the RCP speed sensor and preamplifier. The test data response times reflect that the expected sensor and preamplifier response times (< 0.5 ms) are an insignificant contribution (i.e., less than 0.08%) to the overall response time of the Reactor Trip function on Low-2 RCP Speed channel (assumed < 650 ms).

The remaining elements of the “RCP Speed – Low 2” Channel Calibration and Response Time test are unaffected by this change. The testing of the remainder of the Reactor Trip signal path will be no different than other Reactor Trip functions.

In summary, it is proposed that the sensor and the preamplifier response time be allocated in lieu of measurement testing. The preamplifier will continue to be part of the normal Channel Calibration. The sensor will be subjected to sensor resistance and insulation resistance testing, which will satisfy the qualitative assessment of sensor behavior requirement for Channel Calibration of this sensor. The setpoint calculation for the RCP Speed Reactor Trip does not assume any channel uncertainty attributed to the speed sensor, and therefore, is in alignment with the proposed calibration exception.

Based on the simplicity and anticipated reliability of the RCP speed sensor and preamplifier designs, the proposed changes can be made to the associated TS Surveillance Requirements with no adverse effect on the reactor trip on Low-2 RCP speed safety function, while continuing to satisfy periodic surveillance testing of the function. The RCP speed sensor response time is not dependent on moving parts during operation and produces a nearly instantaneous response delayed only by the transit time for the flow of electric current in the sensor. The preamplifier also provides a very prompt response compared to the overall channel response time, and this response is not expected to degrade because the preamplifier does not rely on any components that can contribute to changes in the time required for signals to propagate from the sensor through the amplifier. A response time will be allocated for the speed sensor and preamplifier that is conservative with respect to the safety analysis allocated response time.

The sensor and preamplifier vendor provided reviews that demonstrate the anticipated high reliability of each product and failure modes and effects analyses (FMEAs) to identify degradation mechanisms that could indicate potential failure modes related to these products. Significant degradation in the sensor and preamplifier response times is not anticipated, and the postulated failure modes described in the FMEAs would be detected during the performance of Channel Calibrations (including the qualitative assessment for sensor calibration) and the continuous PMS inter-channel comparison checks. As informed by the results of the reliability and operating experience reviews and the FMEAs, the Channel Calibration surveillance for the RCP speed sensor is proposed to be performed through a qualitative assessment (i.e., using sensor and insulation resistance tests). Therefore, the use of a qualitative assessment for RCP speed sensors and allocation of RCP Speed Reactor Trip Function sensor and preamplifier subcomponent response times in lieu of actual measurements does not inhibit the performance of the safety function, while continuing to satisfy periodic surveillance testing of the function. This provides confidence that the safety function of the instruments will be satisfied without the need for response time testing, in accordance with IEEE 338, as endorsed by Regulatory Guide 1.118.

Eliminating response time testing requirements for the RCP speed sensor and preamplifier also results in a reduction of radiation exposure to plant workers. Eliminating unnecessary testing on these sensors reduces exposures consistent with the guidelines of As Low As (Is) Reasonably Achievable (ALARA).

4. REGULATORY EVALUATION

4.1 Applicable Regulatory Requirements/Criteria

A review was performed to determine which of the regulations and industry guidance documents discussed above are specifically applicable to RTS Channel Calibration and Response Time testing. It is concluded that the proposed changes adhere to those requirements or, if not directly applicable, satisfy the intent of requirement.

These regulations include the following:

10 CFR 52.98(c) requires NRC approval for any modification to, addition to, or deletion from the terms and conditions of a Combined License (COL). This activity involves changes to plant-specific Technical Specifications (COL Appendix A) to allow a qualitative check (i.e., sensor resistance and insulation resistance tests) as an acceptable means to perform channel calibration for the reactor coolant pump (RCP) speed sensors. An additional change is proposed to the UFSAR to allow the use of a conservatively allocated response time in lieu of measurement for the RCP speed sensors and preamplifiers. Therefore, this activity requires a proposed amendment to the COL.

10 CFR 52, Appendix D, VIII.C.6 states that after issuance of a license, “Changes to the plant-specific TS (Technical Specifications) 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. As discussed above, changes to plant-specific Technical Specifications (COL Appendix A) are requested. Therefore, NRC approval is required for these plant-specific TS changes.

The proposed changes have been evaluated to determine whether applicable 10 CFR 50 Appendix A General Design Criteria (GDC) continue to be met. It was determined that the proposed changes do not affect conformance with the GDC differently than described in the plant-specific DCD or UFSAR, as described below.

- 10 CFR Part 50, Appendix A, GDC 21, “*Protection System Reliability and Testability*” - GDC 21 requires, in part, that the protection system be designed to permit its periodic testing during reactor operation, including a capability to test channels independently to determine failures and losses of redundancy that may have occurred. This activity does not propose any change to the PMS design and therefore, there is no effect on the capability for periodic testing during reactor power operation. This activity continues to allow periodic performance of response time testing and channel calibrations consistent with current requirements by allowing RCP speed sensor and preamplifier response time allocation in lieu of measurement for satisfying the Response Time test Surveillance Requirement and in-place qualitative assessments

of sensor behavior as an acceptable methodology for RCP speed sensor channel calibration surveillances. Therefore, compliance with GDC 21 is not changed.

- Criterion XI, "Test Control," of 10 CFR 50 Appendix B – Criterion XI requires, in part, that a test program be established to ensure that all testing, including operational testing required to demonstrate that systems and components will perform satisfactorily in service, is identified and performed in accordance with written test procedures. The AP1000 surveillance test program continues to meet this requirement. The changes to allocate RCP speed sensor and preamplifier response times and to have calibration of the speed sensors performed by in-place qualitative assessments will be incorporated into the written test procedures that comprise the overall surveillance program for the RTS. Therefore, compliance with Criterion XI is not changed.

- UFSAR Appendix 1A requires testing to be in accordance with Regulatory Guide 1.118 Revision 3 and Institute of Electrical and Electronics Engineers (IEEE) Standard 338-1987. IEEE 338-1987, as endorsed by Regulatory Guide 1.118, Revision 3, states that Response Time Testing is not required if, in lieu of response time testing, the response time of the safety equipment is verified by functional testing, calibration checks or other tests, and if it can be demonstrated that changes in response time beyond acceptable limits are accompanied by changes in performance characteristics which are detectable during other routine periodic tests. The use of a qualitative assessment for RCP speed sensors and allocation of RCP Speed Reactor Trip sensor and preamplifier response times in lieu of actual measurements does not inhibit the performance of the safety function, while continuing to satisfy periodic surveillance testing of the function. This provides confidence that the safety function of the instruments will be satisfied without the need for response time testing, in accordance with IEEE 338, as endorsed by Regulatory Guide 1.118.

4.2 Precedent

No precedent is identified.

4.3 Significant Hazards Consideration

Southern Nuclear Operating Company (SNC) is requesting an amendment to Combined License (COL) Nos. NPF-91 and NPF-92 for Vogtle Electric Generating Plant (VEGP) Units 3 and 4, respectively. The proposed changes would change the COL Appendix A TS definition for Channel Calibration to allow a qualitative check (i.e., sensor resistance and insulation resistance tests) as an acceptable means to perform channel calibration for the reactor coolant pump (RCP) speed sensors. An additional change is proposed to change the UFSAR to allow the use of a conservatively allocated response time in lieu of measurement for the RCP speed sensors and preamplifiers to satisfy the Response Time test Surveillance Requirement.

An evaluation to determine whether or not a significant hazards consideration is involved with the proposed amendment was completed by focusing on the three standards set forth in 10 CFR 50.92(c), “Issuance of amendment,” as discussed below.

4.3.1 Does the proposed amendment involve a significant increase in the probability or consequences of an accident previously evaluated?

Response: No.

The proposed changes would revise the licensing basis, including the plant-specific Technical Specifications, to allow a qualitative check (i.e., sensor resistance and insulation resistance tests) as an acceptable means to perform channel calibration for the reactor coolant pump (RCP) speed sensors and to allow the use of a conservatively allocated response time in lieu of measurement for the RCP speed sensors and preamplifiers to satisfy the Response Time test Surveillance Requirement.

The proposed changes do not affect the safety limits as described in the plant-specific Technical Specifications. In addition, the limiting safety system settings and limiting control settings continue to be met with the proposed changes to the plant-specific Technical Specifications surveillance requirements. The proposed changes do not adversely affect the operation of any systems or equipment that initiate an analyzed accident or alter any structures, systems, and components (SSCs) accident initiator or initiating sequence of events and continue to maintain the initial conditions and operating limits required by the accident analysis, and the analyses of normal operation and anticipated operational occurrences. Therefore, the proposed changes do not result in any increase in probability of an analyzed accident occurring.

The proposed changes do not involve a change to any mitigation sequence or the predicted radiological releases due to postulated accident conditions, thus, the consequences of the accidents evaluated in the UFSAR are not affected.

Therefore, the proposed amendment does not involve a significant increase in the probability or consequences of an accident previously evaluated.

4.3.2 Does the proposed amendment create the possibility of a new or different kind of accident from any accident previously evaluated?

Response: No.

The proposed changes do not affect the safety limits as described in the plant-specific Technical Specifications. In addition, the limiting safety system settings and limiting control settings continue to be met with the proposed changes to the plant-specific Technical Specifications limiting conditions for operation, applicability, actions, and surveillance requirements. The proposed changes do not affect the operation of any systems or equipment that may initiate a new or different kind of accident or alter any SSC such that a new accident initiator or initiating sequence of events is created.

These proposed changes do not adversely affect any other SSC design functions or methods of operation in a manner that results in a new failure mode, malfunction, or sequence of events that affect safety-related or nonsafety-related equipment. Therefore, this activity does not allow for a new fission product release

path, result in a new fission product barrier failure mode, or create a new sequence of events that results in significant fuel cladding failures.

Therefore, the proposed amendment does not create the possibility of a new or different kind of accident from any accident previously evaluated.

4.3.3 Does the proposed amendment involve a significant reduction in a margin of safety?

Response: No.

The proposed changes do not affect the safety limits as described in the plant-specific Technical Specifications. In addition, the limiting safety system settings and limiting control settings continue to be met with the proposed changes to the plant-specific Technical Specifications limiting conditions for operation, applicability, actions, and surveillance requirements. The proposed changes do not affect the initial conditions and operating limits required by the accident analysis, and the analyses of normal operation and anticipated operational occurrences, so that the acceptance limits specified in the UFSAR are not exceeded. The proposed changes satisfy the same safety functions in accordance with the same requirements as stated in the UFSAR. These changes do not adversely affect any design code, function, design analysis, safety analysis input or result, or design/safety margin.

No safety analysis or design basis acceptance limit/criterion is challenged or exceeded by the proposed changes, and no margin of safety is reduced.

Therefore, the proposed amendment does not involve a significant reduction in a margin of safety.

Based on the above, it is concluded that the proposed amendment does not involve a significant hazards consideration under the standards set forth in 10 CFR 50.92(c), and, accordingly, a finding of “no significant hazards consideration” is justified.

4.4 Conclusions

Based on the considerations discussed above, (1) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner, (2) 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, it is concluded that the requested amendment does not involve a significant hazards consideration under the standards set forth in 10 CFR 50.92(c), and, accordingly, a finding of “no significant hazards consideration” is justified.

5. ENVIRONMENTAL CONSIDERATIONS

The proposed changes would change information in the UFSAR that involves a change to the COL Appendix A TS definition for Channel Calibration to allow a qualitative check (i.e., sensor resistance and insulation resistance tests) as an acceptable means to perform channel calibration for the reactor coolant pump (RCP) speed sensors. An additional change is proposed to change UFSAR to allow the use of a conservatively allocated response time in lieu of measurement for the RCP speed sensors and preamplifiers to satisfy the Response Time test Surveillance Requirement.

A review has determined that the proposed changes require an amendment to the COL. However, a review of the anticipated construction and operational effects of the requested amendment has determined that the requested amendment meets the eligibility criteria for categorical exclusion set forth in 10 CFR 51.22(c)(9), in that:

(i) There is no significant hazards consideration.

As documented in Section 4.3, Significant Hazards Consideration, of this license amendment request, an evaluation was completed to determine whether or not a significant hazards consideration is involved by focusing on the three standards set forth in 10 CFR 50.92, “Issuance of amendment.” The Significant Hazards Consideration evaluation determined that (1) the proposed amendment does not involve a significant increase in the probability or consequences of an accident previously evaluated; (2) the proposed amendment does not create the possibility of a new or different kind of accident from any accident previously evaluated; and (3) the proposed amendment does not involve a significant reduction in a margin of safety. Therefore, it is concluded that the proposed amendment does not involve a significant hazards consideration under the standards set forth in 10 CFR 50.92(c), and accordingly, a finding of “no significant hazards consideration” is justified.

(ii) There is no significant change in the types or significant increase in the amounts of any effluents that may be released offsite.

The proposed changes are unrelated to any aspect of plant construction or operation that would introduce any change to effluent types (e.g., effluents containing chemicals or biocides, sanitary system effluents, and other effluents) or affect any plant radiological or non-radiological effluent release quantities. Furthermore, the proposed changes do not affect any effluent release path or diminish the functionality of any design or operational features that are credited with controlling the release of effluents during plant operation. Therefore, it is concluded that the proposed amendment does not involve a significant change in the types or a significant increase in the amounts of any effluents that may be released offsite.

(iii) There is no significant increase in individual or cumulative occupational radiation exposure.

The proposed change in the requested amendment does not affect the shielding capability of, or alter any walls, floors, or other structures that provide shielding. Plant radiation zones and controls under 10 CFR 20 preclude a significant increase in occupational radiation exposure. Furthermore, eliminating Response Time testing requirements for the

RCP speed sensor results in a reduction of radiation exposure to plant workers. Eliminating unnecessary testing on these sensors reduces exposures consistent with the guidelines of As Low As (Is) Reasonably Achievable (ALARA). Therefore, the proposed amendment does not involve a significant increase in individual or cumulative occupational radiation exposure.

Based on the above review of the proposed amendment, it has been determined that anticipated construction and operational effects of the proposed amendment does not involve (i) a significant hazards consideration, (ii) a significant change in the types or significant increase in the amounts of any effluents that may be released offsite, or (iii) a significant increase in the individual or cumulative occupational radiation exposure. Accordingly, the proposed amendment meets the eligibility criteria for categorical exclusion set forth in 10 CFR 51.22(c)(9). Therefore, pursuant to 10 CFR 51.22(b), no environmental impact statement or environmental assessment need be prepared in connection with the proposed amendment.

6. REFERENCES

None.

Southern Nuclear Operating Company

ND-19-0530
Enclosure 2

Vogtle Electric Generating Plant (VEGP) Units 3 and 4

Proposed Changes to Licensing Basis Documents

(LAR-19-008)

Insertions Denoted by Blue Underline and Deletions by ~~Red Strikethrough~~
Omitted text is identified by three asterisks (* * *)

(Enclosure 2 consists of three pages, including this cover page.)

Revise UFSAR Section 7.2, Subsection 7.2.1.1.3, Core Heat Removal Trips, under the heading, "Reactor Trip on Low-2 Reactor Coolant Pump Speed", as shown below:

* * *

The Low-2 reactor coolant pump speed trip provides a direct measurement of the parameter of interest. It permits the plant to ride through many postulated voltage or frequency dip transients without reactor trip if safety limits are not violated. Selection of the Low-2 reactor coolant pump speed trip setpoint and time response provide for the timely initiation of reactor trip during the complete loss of flow accident and the limiting frequency decay event, consistent with the analysis results reported in Chapter 15.

The reactor coolant pump speed sensor response time is not dependent on moving parts and produces a nearly instantaneous response delayed only by the transit time for the flow of electric current in the sensor. The preamplifier also provides a prompt response compared to the overall channel response time and is designed such that there are no components that can contribute to changes in the response time. The response time for the reactor coolant pump speed sensor and preamplifier is allocated in lieu of direct measurement. This is conservative with respect to the response time identified through benchmark testing (Reference 6).

The reactor coolant pump speed detectors perform their protective function (during the complete loss of flow accident and the limiting frequency decay event) in an environment (temperature, humidity, pressure, chemical, and radiation) that is not changed by the event. Therefore, it is not necessary to impose environmental qualification requirements on these detectors more restrictive than those imposed for use under rated conditions. The reactor coolant pump speed detectors are qualified for use under rated conditions with their performance verified by operation in the plant. The reactor coolant pump speed detectors are qualified to the most limiting vibrations experienced by pump operation.

* * *

Revise UFSAR Subsection 7.2.4, References, as shown below:

* * *

6. APP-GW-GLR-804, "AP1000® Technical Report to Support Modification to Response Time and Channel Calibration Testing Requirements for Reactor Coolant Pump Speed," Revision 0, Westinghouse Electric Company, LLC.

Revise COL Appendix A Technical Specification 1.1, Definitions, as shown below.

CHANNEL CALIBRATION	A CHANNEL CALIBRATION shall be the adjustment, as necessary, of the channel output such that it responds within the necessary range and accuracy to known values of the parameter that the channel monitors. The CHANNEL CALIBRATION shall encompass all devices in the channel required for OPERABILITY. Calibration of instrument channels with resistance temperature detector (RTD) ~~or~~, thermocouple, or reactor coolant pump speed sensors may consist of an inplace qualitative assessment of sensor behavior and normal calibration of the remaining adjustable devices in the channel. The CHANNEL CALIBRATION may be performed by means of any series of sequential, overlapping, or total channel steps.

Southern Nuclear Operating Company

ND-19-0530
Enclosure 3

Vogtle Electric Generating Plant (VEGP) Units 3 and 4

Conforming Changes to the Technical Specifications Bases (For Information Only)

(LAR-19-008)

Insertions Denoted by Blue Underline
Omitted text is identified by three asterisks (* * *)

(Enclosure 3 consists of three pages, including this cover page.)

NOTE: LAR-2019-001 [ML19084A309, ML19084A310] proposes changes to Surveillance Requirement numbers that will be reflected in the revised Technical Specification Bases pages if it is approved prior to this LAR. Specifically, LAR-2019-001 changes SR 3.3.1.8 to SR 3.3.1.5 and SR 3.3.1.11 to SR 3.3.1.8.

Technical Specifications Bases B 3.3.1, Reactor Trip System (RTS) Instrumentation, is revised as follows:

* * *

SURVEILLANCE REQUIREMENTS

* * *

SR 3.3.1.8

* * *

… When an interlock is not supporting the associated Function's OPERABILITY at the existing plant conditions, the affected Function's channels must be declared inoperable and appropriate ACTIONS taken.

The RCP speed sensor (Function 9) is calibrated using a qualitative assessment of the behavior that is obtained through insulation resistance and sensor resistance testing to complement the normal calibration of the remaining adjustable devices in Function 9.

SR 3.3.1.8 is modified by a Note stating that this test shall include verification that the time constants are adjusted to within limits where applicable.

* * *

SR 3.3.1.11

* * *

Response time may be verified by actual response time tests in any series of sequential, overlapping or total channel measurements, or by the summation of allocated sensor, signal processing and actuation logic response times with actual response time tests on the remainder of the channel. Allocations for sensor response times may be obtained from: (1) historical records based on acceptable response time tests (hydraulic, noise, or power interrupt tests), (2) in place, onsite, or offsite (e.g. vendor) test measurements, or (3) utilizing vendor engineering specifications. WCAP-13632-P-A, Revision 2, "Elimination of Pressure Sensor Response Time Testing Requirements" (Ref. 8), provides the basis and methodology for using allocated sensor response times in the overall verification of the channel response time for specific sensors identified in the WCAP. The response time of the RCP speed sensor (Function 9) and its associated preamplifier is allocated in lieu of measurement, based on the specific design of the component models being used (Reference 10). Response time verification for other sensor types must be demonstrated by test.

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REFERENCES

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10. Safety Evaluation by the Office of New Reactors related to Amendment Nos. [XXX] and [YYY] to the Combined License Nos. NPF-91 and NPF-92, respectively, Vogtle Electric Generating Plant Units 3 and 4, Docket Nos. 52-025 and 52-026, dated [DATE] [ML19XXXAXXX].

Implementation Note:
(where, “XXX” and “YYY” are the Unit 3 and Unit 4 Amendment numbers, respectively, “DATE” is the date of issuance for the license amendment, and “ML19XXXAXXX” is the ADAMS Accession Number for the Safety Evaluation issued with the license amendment that approves this License Amendment Request.)