Vogtle PEmails

From: Hoellman, Jordan
Sent: Tuesday, January 22, 2019 11:51 AM
To: Vogtle PEmails
Subject: Transmittal of Information for Jan. 24th Tech Exch Meeting re: PMS TS Surveillance LAR - Non-Proprietary Information
Attachments: 20190124_APP-GW-GLR-185_Non-Prop.pdf; 20190124 TechExch Slides - PMS TS SR LAR.pdf; 20190124_SVP_SV0_005390_Affidavit and Req for Withholding.pdf

Forwarding to ADAMS to support the January 24, 2019 public meeting discussion.

From: Haggerty, Neil [mailto:X2NHAGGE@SOUTHERNCO.COM]
Sent: Thursday, January 17, 2019 6:49 PM
To: Patel, Chandu <Chandu.Patel@nrc.gov>; Hoellman, Jordan <Jordan.Hoellman2@nrc.gov>
Cc: Sparkman, Wesley A. <WASPARKM@southernco.com>; Agee, Stephanie Y. <SYAGEE@southernco.com>; Arafeh, Yasmeen N. <YNARAFEH@southernco.com>
Subject: [External_Sender] Transmittal of Information for Jan. 24th Tech Exch Meeting re: PMS TS Surveillance LAR - Non-Proprietary Information

This message provides the non-Proprietary Information that will be used for the Technical Exchange Meeting on the Protection and Safety Monitoring (PMS) Technical Specifications (TS) Surveillance License Amendment Request (LAR).

The following non-proprietary information is provided:

- 20190124_APP-GW-GLR-185_Non-Prop.pdf
- 20190124 TechExch Slides - PMS TS SR LAR.pdf (provides the slides that will be presented during the January 24th meeting)
- 20190124_SVP_SV0_005390_Affidavit and Req for Withholding.pdf (supports the request to withhold proprietary information from the Public)

The attachments to this message may be provided to the Public prior to the January 24th meeting.

SNC has provided the Proprietary information in a separate email, for distribution to NRC Staff in preparation of the meeting.

Please contact Mr. Wesley A. Sparkman at (205) 992-5061 if you have any questions/comments regarding this information.

Thank you,

Neil Haggerty

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20190124_APP-GW-GLR-185_Non-Prop.pdf	561208	
20190124 TechExch Slides - PMS TS SR LAR.pdf	1090367	
20190124_SVP_SV0_005390_Affidavit and Req for Withholding.pdf	638488	

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Preliminary Information to Support NRC Technical Exchange Meeting on Protection and Safety Monitor System Surveillance Reduction

Introduction

This document provides preliminary information to support an NRC Technical Exchange meeting related to the reduction of Protection and Safety Monitoring System Technical Specification Surveillance Requirements. The information provided below summarizes potential Vogtle 3 & 4 licensing actions and the associated technical evaluations. The following information is based upon on-going draft analyses and is still under formal review. Therefore, this information is subject to change. Any potential future licensing actions associated with the final version of this information will follow the 10 CFR Part 52 change control process separate from this report.

Description of Proposed Activity

The following licensing actions are proposed:

1. The SRs requiring a manual Channel Check to be performed on PMS components are proposed to be removed from the TS.
2. The SRs requiring a manual COT to be performed on PMS components are proposed to be removed from the TS.
3. The SRs requiring a manual ALT to be performed on PMS components (excluding the ADS and IRWST injection blocking device) are proposed to be removed from the TS.
4. The approach for satisfying the reactor trip and ESFAS response time SRs is changed. The current approach for satisfying the PMS response time surveillance tests is to perform a response time tests on the PMS equipment. The proposed method is to use allocated response times for the PMS equipment in lieu of testing. The reactor trip and ESFAS response time definitions allow an exception to testing if the response times can be verified via a previously reviewed and approved NRC methodology. This activity seeks NRC approval for the methodology outlined in this license amendment request. If approved, the Bases will be updated to allow for allocated values to be used for the PMS equipment to support the overall response time test SRs. Text is also added to describe where the PMS equipment allocated values can be found.

The SRs throughout the TS are renumbered to support changes 1, 2, and 3. Associated Bases changes are also made for the TS changes proposed above. This includes rewording the Background description of the PMS self-diagnostic test features in Bases 3.3.1 and 3.3.8 to more clearly align with the changes described above. The Bases surveillance requirement description for SR 3.3.4 and SR 3.3.6 is revised to acknowledge that these functions have no SRs due to self-checking features continuously monitoring logic OPERABILITY.

None of the activities change any PMS software or hardware. The activity credits the PMS self-diagnostic test features already part of the approved PMS design and uses these existing self-diagnostic features to justify the removal of redundant manual PMS surveillance tests.

Technical Evaluation of the Activity

Self-Diagnostic Overlap with Manual Surveillance Testing Evaluation

An evaluation was performed to compare the manual PMS surveillance tests included in the TS with the PMS self-diagnostic tests. The evaluation included the following general process:

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A summary of the evaluation of each manual surveillance test and the available self-diagnostic tests is included in Table 1 below. In Table 1, the surveillance tests applicable to the PMS are listed, along with the applicable SR number and a test description. A high-level description of the self-diagnostic coverage for each manual surveillance test is provided. A summary conclusion is made for each surveillance test based on the associated evaluation.

Most of the SRs associated with PMS Channel Checks, COTs, and ALTs are deleted based on the information in Table 1. With a few exceptions addressed in Table 1, it is shown that the self-diagnostic tests can detect the same failures as would be detected by the Channel Check, COT and ALT surveillance tests. In addition, though the Response Time Tests will be retained as a surveillance requirement, it is determined to be unnecessary to periodically test the response time of the PMS equipment. An allocated value for the PMS equipment is proposed to be used in lieu of a test in order to support the overall Response Time Test measurement. With an exception addressed in Table 1 below, it is shown that the self-diagnostic tests would capture any credible failure resulting in slower response times.

<u>Overview of Self-Diagnostic Testing Features</u>

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Improved Reliability, Safety, and Operability of Self-Diagnostics

The self-diagnostics are a reliable and superior alternative to manual surveillance tests. The self-diagnostics tests are automatically and continuously executed. This is in contrast to the manual tests which are executed every 92 days or 24 months, per the surveillance test program. Therefore, the self-diagnostics tests are executed more frequently than the manual tests. In addition, the self-diagnostics tests do not reduce the redundancy of the safety system. The PMS remains at full system redundancy during the self-diagnostic tests, unlike the manual surveillance tests which require the system to be at less than full redundancy. Because the surveillance tests are accomplished by the operator, they have a higher probability of a human error adversely impacting the operation of the safety system than the self-diagnostic tests which are inherently less prone to error than a human operator. This is supported by the fact that the self-diagnostics have gone through a rigorous design life-cycle processes.

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Qualification of AC160 Self-Diagnostics

The AC160 diagnostics were commercially dedicated to the same standards as the rest of the AC160 system software. In 2000, the NRC issued a safety evaluation report (ML003740165) on the Common Q Topical Report (CENP-396-P, Rev. 01 which is the predecessor to WCAP-16097-P-A). In the safety evaluation report the NRC acknowledged receipt of Westinghouse document GWKF 700 777, "Design and Life Cycle Evaluation Report on Previously-Developed Software in ABB AC160, I/O Modules and Tool Software" Rev. 02 (February 22, 2000), in support of the commercial dedication of the AC160. The safety evaluation report stated the, “AC160 PDS [Previously Developed Software] is composed of the AC160 software, S600 I/O Module(s) software, and ABB Tool software.” The evaluation is based on the requirements specified in International Electrotechnical Commission (IEC) standard IEC-60880, "Software for Computers in the Safety Systems of Nuclear Power Stations." IEC 60880 is referenced in IEEE 7-4.3.2-2003, "IEEE Standard Criteria for Digital Computers in Safety Systems of Nuclear Power Generating Stations." IEC 60880 is comparable to IEEE 7-4.3.2-2003, and the staff has found standard IEC 880 to be an acceptable equivalent.”

The Design and Lifecycle Evaluation (DLCE) applies to all aspects of the PDS including the system software that executes the nuclear application program and the diagnostics integrated with the system software. In other words, the same software quality approach applied to both aspects of the system software. Therefore, the Common Q Platform diagnostics were developed using a rigorous process which was accepted by the NRC.

These same diagnostics were reviewed by the NRC staff in relation to the Palo Verde Nuclear Generating Station Core Protection Calculator System Technical Specifications. The NRC concluded, “per the safety evaluation of the Palo Verde Nuclear Generating Station (PVNGS) Core Protection Calculator System (ML0330303630) in allowing for extended surveillance testing frequencies, “the NRC

staff found that the diagnostics to be employed on the Common Q system are more extensive and have more coverage than in the legacy system."

Using self-diagnostics is also consistent with the Background sections of Bases 3.3.1 and 3.3.8 which state that PMS testing will be accomplished with continuous system self-checking features, to the extent practical. This text is enhanced throughout the Bases to clearly identify how the self-diagnostics are relied upon in lieu of manual surveillance tests and to ensure the self-diagnostics cannot be changed in such a way as to invalidate how they are currently used to confirm system operability.

Similarly, the PMS, including its application-specific self-diagnostics, was developed under a formal life-cycle process per COL Appendix C ITAAC Table No. 2.5.02.11 and 2.5.02.12.

Therefore, the PMS and Common Q self-diagnostic equipment relied upon to test system operability has been developed using project life-cycles which included specific processes for conceptual design activities, requirements development, design activities, implementation, testing, and commercial dedication.

Self-Diagnostics Compliance with Regulations

A review was performed to determine which of the regulations and industry guidance documents discussed above are specifically applicable to the self-diagnostics. It is concluded that the self-diagnostics adhere to those requirements or, if not directly applicable, satisfy the intent of requirement.

GDC 18 and GDC 21 of 10 CFR Appendix A require systems important to safety to be designed to permit periodic testing. This includes testing of the performance of the components of the system and the system as a whole during plant operation. This activity does not propose any change to the PMS design. The PMS continues to be designed to permit periodic testing during plant operation. This activity credits the PMS self-diagnostics in certain instances in lieu of manual surveillance tests. The PMS self-diagnostics are design features which periodically and continuously test the system during plant operations, which is consistent with GDC 18 and GDC 21.

Criterion XI, "Test Control," of 10 CFR 50 Appendix B requires a test program to be established to ensure the safety system is tested in accordance with procedures to verify it is performing satisfactorily while in-service. The AP1000 surveillance test program continues to meet this requirement. The self-diagnostic tests support this requirement in that it is part of the overall suite of tests available to the PMS used to verify the PMS is performing satisfactorily while in-service. While performing the tests "in accordance with test procedures" is not directly applicable to self-diagnostic testing, the self-diagnostics execute in a specific, well-defined sequence and respond to given test failures in a predictable way, as shown in the evaluation summarized above.

Similar to GDC 18 and GDC 21, IEEE 603-1991 requires the protection system to have the capability for testing and calibration during power operations while retaining the capability of the safety systems to accomplish their safety functions. The protection system needs to be capable of performing the tests described in IEEE 338-1987. As stated above, this activity does not propose any change to the PMS design, and the self-diagnostics support this requirement. Though not always necessary due to self-diagnostic coverage, the AP1000 PMS is capable of performing the tests as described in IEEE 338-1987.

According to UFSAR Appendix 1A requires testing to be in accordance with Regulatory Guide 1.118 Revision 3 and IEEE 338-1987. Regulatory Guide 1.118 and IEEE 338-1987 provide guidance specifically for periodic testing included "as part of the surveillance program." It defines the scope of periodic testing as including functional tests and checks, calibration verification, and time response measurements, as required, to verify the safety system performs to meet its define safety function. IEEE 338-1987 does not define how to determine what is required to be part of the manual surveillance

program, but provides guidance for those tests within the surveillance program. The self-diagnostic tests are not part of the surveillance program and, therefore, the requirements in IEEE 338-1987 Section 6 are not directly applicable. In addition, IEEE 338-1987 is largely written specifically for manual testing and, therefore, the guidance does not explicitly address self-diagnostic testing features. IEEE 338-1987 Section 5, item 8 addresses the "automatic test features" and "programmable digital computer" used within the surveillance program and the need to meet the requirements in the standard for these items. Even though the self-diagnostics are not part of the surveillance program, they do support the basis of the standard (i.e., IEEE 338-1987 Section 4) in that they continuously and periodically check the system to verify operability. The self-diagnostic tests also support the design requirements included in the standard (i.e., IEEE 338-1987 Section 5) in the following ways:

- The self-diagnostics support the requirement to have a system designed to be testable.
- The self-diagnostics permit the independent testing of redundant channels while maintaining the capability of these systems to respond to actual signals.
- The self-diagnostics are designed to provide overlap testing in that the diagnostics cover all relevant PMS components, including multiple diverse diagnostics covering the same PMS equipment.

10 CFR 50.36 establishes the need to have Technical Specifications; including limiting conditions for operations and surveillance requirements. Surveillance requirements are used, in part, to assure that the limiting conditions for operation will be met. It is concluded that, in some instances, the manual PMS SRs associated with COT, ALT, and Channel Checks are not required to assure the corresponding LCO is met. This is because comparable tests, as evaluated above, are built into the PMS design. These self-diagnostic tests have been shown to identify the same issues as the corresponding SRs and alert the operator of any condition contrary to the LCO.

Table 1 – Summary of the Manual Surveillance Tests and Self-Diagnostic Tests for the PMS Components

Test Name	Relevant (PMS) SRs	Test Description	Summary of PMS Self-Diagnostic and Redundant Surveillance Test Coverage Evaluation
Channel Calibration	3.3.1.8 3.3.1.9 3.3.2.3 3.3.3.3 3.3.8.3 3.3.10.3 3.3.11.3 3.3.13.3 3.3.14.3 3.3.17.2 3.3.20.3 3.4.1.4 3.4.9.3 3.9.3.2	**Definition:** 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 in place 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.	Not applicable for this activity. Calibration will continue to be a manual surveillance test.
Channel Check	3.3.1.1 3.3.2.1 3.3.3.1 3.3.8.1 3.3.10.1 3.3.11.1 3.3.13.1 3.3.14.1 3.3.17.1 3.3.20.1 3.9.3.1	**Definition:** A qualitative assessment, by observation, of channel behavior. This test includes a comparison of the channel indication and status to other indications or statuses derived from independent instrument channels measuring the same parameter. **Test Overview:** The manual Channel Check identifies if a component has failed by comparing all four divisions' redundant instrument input values (inter-channel check) and comparing the redundant BPL measurements within a division (intra-channel check). This test checks for a significant deviation that may indicate a gross channel failure. This is accomplished by visual comparison of the indicators at the MTP, and noting if a pre-defined difference exists between the highest and lowest indicator. **PMS Components Covered:** The data from the process sensor passes to the A/D converter within the BPL and is displayed on the MTP.	The PMS performs continuous channel comparison on specific sensor values across all four divisions. This includes intra-channel and inter-channel comparison checks. This self-diagnostic test is described in WCAP-16675 Section 6.2. • [.]a,c The PMS self-diagnostic test verifies the same information verified by the manual Channel Check test. Therefore, the PMS Channel Checks can be eliminated. A graphical representation of the self-diagnostic channel check test is shown in Figure A.3 of Appendix A.

Test Name	Relevant (PMS) SRs	Test Description	Summary of PMS Self-Diagnostic and Redundant Surveillance Test Coverage Evaluation
Channel Operational Test (COT)	3.1.8.1 3.3.1.6 3.3.1.7 3.3.2.2 3.3.3.2 3.3.8.2 3.3.10.2 3.3.11.2 3.3.13.2 3.3.14.2 3.3.20.3	**Definition:** Injection of a simulated or actual signal into the channel as close to the sensor as practicable to verify channel operability. Includes adjustments, as necessary, of the required alarm, interlock, and trip setpoints such that the setpoints are within the necessary range and accuracy. **Test Overview:** The COT for all SRs except 3.3.20.3 is satisfied by manually injecting a simulated digital signal at the MTP and verifying that the BPL actuates as expected. This includes: • Manually entering a signal value for the input to the function being tested • Executing the function with the test input value • Monitoring the function outputs to determine if the response to the test input value is correct. The COT for the ADS and IRWST injection blocking device (SR 3.3.20.3) confirms the device is capable of unblocking on low CMT level. The ALT for the device (SR 3.3.20.5) confirms it is capable of unblocking for each of the blocking device inputs (i.e., remote shutdown room transfer switch, block/unblock switch, battery charger under-voltage, and CMT level low). Therefore, the ALT for the blocking device is more comprehensive than the COT and overlaps the COT. **PMS Components Covered:** The BPL PM646A processor modules, CI631 module, BIOB, and the HSL equipment connecting the BPL to the LCL are used to process the digital test injection signal. In addition, the ADS and IRWST injection blocking device is covered via 3.3.20.3. A graphical representation of the equipment covered by the COT surveillance test is shown in Figure A.4 of Appendix A.	The PMS self-diagnostic tests have been shown to adequately test the operability of the same PMS components tested as part of the manual COTs in all the SRs listed except SR 3.3.20.3, which is addressed below. Specifically, the PM646A, CI631 Module, BIOB, and HSL Common Q Platform diagnostics were evaluated and shown to cover the applicable processor module failure modes. In addition, the self-diagnostic tests have been shown to put the system into a safe state following the same PMS failures evaluated as part of the PMS FMEA. In all cases, the internal fault detected by the diagnostic initiates the necessary visual and audible annunciation in the main control room so that the operator can take the appropriate action. The COT for the ADS and IRWST injection blocking can be eliminated. The ALT on the ADS and IRWST injection blocking device fully covers the component and completely overlaps the COT which only partially tests the device. [ ]^{a,c} Therefore, the COT associated with the ADS and IRWST injection blocking device can be eliminated. In summary, the PMS self-diagnostics adequately test the components tested as part of the COT (except for SR 3.3.20.3) and, therefore, the COT can be eliminated. In addition, the COT for the ADS and IRWST injection blocking device (i.e., SR 3.3.20.3) can be eliminated because the ALT performed on the device is adequate.

Test Name	Relevant (PMS) SRs	Test Description	Summary of PMS Self-Diagnostic and Redundant Surveillance Test Coverage Evaluation
Actuation Logic Test (ALT)	3.3.4.1 3.3.6.1 3.3.15.1 3.3.16.1 3.3.20.5	**Definition:** The application of various simulated or actual input combinations in conjunction with each possible interlock logic state required for operability of a logic circuit and the verification of the required logic output. **Test Overview:** The ALT surveillance tests include separate tests for the reactor trip system logic (SR 3.3.6.1), ESF system logic (SR 3.3.15.1, SR 3.3.16.1), ESF generated reactor trip actuation logic (SR 3.3.4.1), and the ADS and IRWST injection blocking device logic (SR 3.3.20.5). The ALT for the ADS / IRWST injection blocking device (SR.3.3.20.5) is not applicable to this activity because it will continue to be included as a manual surveillance test within the Technical Specifications. For the reactor trip system logic ALT (SR 3.3.6.1), the injected signal goes from the LCL to the reactor trip matrix logic via the DO630 module. Proper function is verified using the digital output display to check the current flow through the appropriate reactor trip matrix termination unit ITP monitoring resistors, and thereafter using the DO630 status indicators. For the ESF system logic ALT (SR 3.3.15.1 and SR 3.3.16.1), the injected signal goes from the LCL to the ILP (via the HSLs). Confirmation that the system is functioning properly is obtained by monitoring that the correct ESF system level actuation signals are received by the ILP component control processor modules. The signal path for the ESF generated reactor trip actuation logic (SR 3.3.4.1) is almost entirely covered by the other two tests described above. The only aspect of the safety path associated with this surveillance tests not covered by the other two surveillance tests is the communications over the BIOB between the ESFAS processor module and the reactor trip processor module. **PMS Components Covered:** • Reactor trip system logic ALT: RT LCL processor modules, communication processor modules, CI631, BIOB, DO630, reactor trip matrix termination unit • ESF system logic ALT: ESF LCL processor modules, communication processor modules, CI631, BIOB, HSL equipment, ILP component control processor module • ESF generated reactor trip actuation logic ALT: RT and ESF LCL processor modules, communication processor modules, CI631, BIOB, DO630, reactor trip matrix termination unit, BIOB between the ESF and RT processor modules. A graphical representation of the equipment covered by the ALT surveillance test is shown in Figure A.5 and Figure A.6 of Appendix A.	The PMS self-diagnostic tests have been shown to adequately test the operability of the same PMS components tested as part of the manual ALTs, except for two instances that are addressed below. Specifically, the PM646A, CI631 Module, BIOB, and HSL Common Q Platform diagnostics were evaluated and shown to cover the applicable processor module failure modes. In addition, the self-diagnostic tests have been shown to put the system into a safe state following the same PMS failures evaluated as part of the PMS FMEA. In all cases, the internal fault detected by the diagnostic initiates the necessary visual and audible annunciation in the main control room so that the operator can take the appropriate action. The components not fully covered by self-diagnostic tests include the DO630 module and the reactor trip matrix termination unit. However, these components are also tested every 92 days as part of the TADOT associated with SR 3.3.7.1. Any failure that would be detected in these components by the ALT will also be detected by the TADOT. In summary, the PMS self-diagnostics for the components tested as part of the ALT and the existing TADOT associated with SR 3.3.7.1 together provide complete coverage for the components tested as part of the ALT. Therefore, it is concluded that the ALT is unnecessary and can be deleted from the TS (except for SR 3.3.20.5).
Actuation Logic Output Test (ALOT)	3.3.15.2 3.3.16.2	**Definition:** The application of simulated or actual logic signals and the verification of the required component actuation output signals up to, but not including, the actuated device. The test may be performed by means of any series of sequential, overlapping, or total steps.	Information on the on-going ALOT evaluation is included at the end of this table.
TADOT	3.3.1.10 3.3.5.1 3.3.7.1 3.3.9.1 3.3.12.1 3.3.18.4 3.3.20.6	**Definition:** The operation of the trip actuating device. The TADOT adjusts, as necessary, the trip actuating device so that it actuates at the required setpoint within the necessary accuracy.	Not applicable for this activity. The TADOT will continue to be a manual surveillance test.

Test Name	Relevant (PMS) SRs	Test Description	Summary of PMS Self-Diagnostic and Redundant Surveillance Test Coverage Evaluation
Response Time Test	3.3.1.11 3.3.2.4 3.3.3.4 3.3.4.2 3.3.8.4 3.3.10.4 3.3.11.4 3.3.13.4 3.3.14.4	**Definition:** A test of the response time for a reactor trip and engineered safety feature protection channel. 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. **Test Overview:** Response time tests verify that the individual reactor trip and ESFAS channel/division actuation response times, from sensor to actuating device, are less than or equal to the maximum values assumed in the accident analysis. This activity focuses specifically on the PMS equipment portion of the protection path and not the sensor or the actuating device. **PMS Components Covered:** Figure A.7 of Appendix A shows the signal paths taken for PMS reactor trips and ESF actuations. In each case, the signal comes into the BPL processor module from an actual or simulated signal and the applicable I/O module (i.e., DP620, AI688, AI687, or DI621 module). The reactor trip inputs then pass through the reactor trip LCL, the DO630 module, the reactor trip matrix termination unit, then to the reactor trip switchgear under-voltage and shunt trip mechanisms. The ESF actuation inputs pass through the ESF LCL, the ILP, SRNC, and the CIM. In each case, the signal path also passes through the HSLs, BIOB, and the CI631 module. The response time of this signal path is measured to ensure it is less than the maximum allowable response time assumed in the accident analysis.	Figure A.7 of Appendix A provides a simplified diagram of the response time signal path, along with the other surveillance tests that cover each part of the signal path. Each component in the signal path was evaluated to determine if the associated self-diagnostics within the equipment could adequately detect failures that impact response times. The PMS self-diagnostic tests or other surveillance tests (not being removed in this activity) have been shown to adequately test the PMS components (except the DO630 module) within the reactor trip and ESF actuation response time signal paths and identify any failure that could impact equipment response times. [ ]^{a,c}

On-going ALOT Evaluation

The TS SR evaluation of the ALOT is still in progress and is not as far along in the development and review process as the other surveillance tests. The *preliminary* results are included in this section. As indicated below, the ALOT surveillance test will likely need to remain in the TS and, therefore, may not be included in the license amendment request.

Test Overview: The ALOT demonstrates that both redundant signal paths from the inputs to the ILPs through the CIM logic and CIM output driver circuits (ILP to actuator test) in the ESF Actuation Subsystem Logic process injected LCL system actuation signals for the applicable actuation function. During this test, [

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PMS Components Covered: ILP processor module (PM646A), communication module (CI631), digital input module (DI621), backplane I/O bus (BIOB), HSL (ILP to/from SRNC), SRNC, double and single width transition panels (DWTP/SWTP), CIM, ADS/IRWST blocking device, squib valve TU, and the component control Isolation barriers to Non-1E components.

A graphical representation of the equipment covered by the ALOT surveillance test is shown in Figure A.8 of Appendix A.

- For the components that have already been covered in previous sections (CI631s, PM646As, and BIOBs), it has been determined that diagnostics are sufficient, and therefore, ALOT testing is not required.
- The evaluation of the HSL, DI621s, and the SRNC concluded that the diagnostics are sufficient, and ALOT testing is not required.
- Based on the evaluation performed for the ALT and COT, it has been determined that ALT surveillance testing is necessary for the ADS/IRWST blocking device.
- For the CIM, there are multiple self-diagnostics that detect most of the postulated faults. [

  ]a,c
- The evaluation of the double-wide transition panel (DWTP), single-wide transition panel (SWTP), squib valve termination unit, and the component control Isolation barriers to Non-1E is still being performed, and thus, there are no results available for these components.

The preliminary evaluation indicates that for most components associated with ALOT, the PMS self-diagnostic tests adequately test the operability of the same PMS components tested as part of the manual ALOTs, except for a small subset of components. In addition, the self-diagnostic tests have been shown to put the system into a safe state following the same PMS failures evaluated as part of the PMS FMEA. In most cases, the internal fault detected by the diagnostic initiates the necessary visual and audible annunciation in the main control room so that the operator can take the appropriate action. For the cases where the diagnostics are not sufficient to detect failures, surveillance testing or some other method (i.e., overlap testing, additional diagnostics, etc.) of detecting the failure will need to be performed. This will be determined once the evaluation is complete.

Appendix A
Supporting Figures

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Preliminary Vogtle 3 & 4 UFSAR Markups

Criteria Section	Referenced Criteria	AP1000/ FSAR Position	Clarification/Summary Description of Exceptions
General		Conforms	The SRP 3.5.1.3 issued in 1981 and Regulatory Guide 1.115, issued in 1977, provide criteria for protection against the effects of potential turbine missiles. Reference 28 issued in 1984 states that "the Nuclear Regulatory Commission staff has shifted emphasis in the reviews of the turbine missile issue from the strike and damage probability (P_2xP_3) to the missile generation probability (P_1) and, in the process, has attempted to integrate the various aspects of the issue into a single coherent evaluation." The AP1000 turbine is arranged in a radial orientation. The three low pressure turbines incorporate fully integral rotors. The turbine conforms with the criteria given in Reference 28 and WCAP-16650 (Reference 52).
Conformance with this Regu			
General			
Reg. Guide 1.116, Rev. O-I of Mechanical Equipment			
Conformance for DCD scop			
General	ANSI N45.2		
Conformance for remaining			
General			
Reg. Guide 1.117, Rev. 1,			
C.1			
C.2			
C.3			
APPENDIX			
General			
Reg. Guide 1.118, Rev. 3,			
General	IEEE Std. 338-1987	Conforms	Guidelines apply to safety-related dc power systems. Since the AP1000 has no safety-related ac power sources, the guidelines do not apply to the AP1000 ac power sources.
Reg. Guide 1.119 – Withdrawn			

The types of tests described in IEEE 338 Section 6.3 are not all applicable to the protection and safety monitoring system. In certain instances, the self-diagnostics included within the protection and safety monitoring system are used to verify that the safety system is capable of meeting its designed safety function in lieu of manual testing as part of the surveillance program.

Specifically, channel checks, logic system function tests, and response time tests are not manually performed on the protection and safety monitoring system equipment as part of the AP1000 surveillance program. In these cases, self-diagnostic test features continuously monitor the system.

Functional tests are only performed on the PMS equipment that do not have complete self-diagnostic coverage. The Technical Specifications provide the necessary manual functional testing requirements in these instances (e.g., ALT and TADOT).

Channel calibration verification tests are included in the AP1000 surveillance program.

- Continuity of the wiring is verified for devices that cannot be tested at power without damaging or upsetting the plant. Operability of the final actuated equipment is demonstrated at shutdown.

includes

During reactor operation, the basis for acceptability of engineered safety features actuation is the successful completion of the overlapping tests performed on the protection and safety monitoring system. Process indications are used to verify operability of sensors.

7.3.2.2.7 Conformance to Requirements on Bypassing Engineered Safety Features Actuation Functions (Paragraph 5.8, 5.9, 6.6, and 6.7 of IEEE 603-1991)

Discussions on bypassing are provided in WCAP-15776 (Reference 1) and Subsection 7.3.1.4.

7.3.2.2.8 Conformance to the Requirement for Completion of Engineered Safety Features Actuation Once Initiated (Paragraph 5.2 of IEEE 603-1991)

Once initiated, engineered safety features proceed to completion.

Equipment actuated on a safeguards actuation signal cannot be returned to its previous position for a predetermined time period following initiation of the safeguards actuation signal. A block of the automatic safeguards signal is permitted at this time, if the reactor is tripped. This interlock is shown in Figure 7.2-1, sheet 11.

Resetting a system-level safeguards signal does not terminate any safeguards function. Rather, it permits the operator to individually reposition equipment. Equipment cannot be reset until the system-level signal is reset.

7.3.2.2.9 Conformance to the Requirement to Provide Manual Initiation at the System-Level for All Safeguards Actuation (Paragraph 6.2 of IEEE 603-1991)

Manual initiation at the system-level exists for the engineered safety features actuation. These system-level manual initiations are discussed in Subsections 7.3.1.1 and 7.3.1.2.

As a minimum, two controls are provided for each system-level manual initiation so that the protective function can be manually initiated at the system-level, despite a single random failure in one control. In certain applications, such as automatic depressurization, two pairs of controls are provided. One pair must be actuated simultaneously. This reduces the likelihood of inadvertent actuation while providing a design that meets the single failure criterion.

7.3.3 Combined License Information

This section contained no requirement for information.

7.3.4 References

1. WCAP-15776, "Safety Criteria for the AP1000 Instrument and Control Systems," April 2002 (as modified by changes provided in UFSAR Appendix 7A).

~~Depending on the protection and safety monitoring hardware used for AP1000, either WCAP-13383 or NABU-DP-00014-GEN describe design processes that will be used for AP1000.~~

Commercial Dedication

[INSERT 1]

~~WCAP-13383 (Reference 3) and CENPD-396-P~~ WCAP-16097-P-A (Reference 7) provides for the use of commercial off-the-shelf hardware and software through a commercial dedication process. Control of the hardware and software during the operational and maintenance phase is the responsibility of the Combined License applicant.

- Revise Section 7, REFERENCES as follows:

  3. ~~WCAP-13383, Revision 1 (NP), "AP600 Instrumentation and Control Hardware and Software Design, Verification, and Validation Process Report," June 1996.~~ Not Used.

  4. ~~CE-CES-195~~ WCAP-16096-P-A, Rev. ~~01~~ 4, "Software Program Manual for Common Q™ Systems," ~~May 26, 2000~~ February 2013.

  7. ~~CENPD-396-P~~ WCAP-16097-P-A, Rev. ~~01~~ 3, "Common Qualified Platform Topical Report," ~~May 2000~~ February 2013.

- Revise Section 3.9, "Conformance to the Requirements to Maintain Independence Between Safety Systems and Other Interconnected Equipment (Paragraph 5.6.3.1 of IEEE 603-1991)," as follows:

  Signals from safety system equipment for control system use are transmitted through isolation devices. These devices are part of the safety system and are tested to confirm the credible failures at the output of the isolation device do not prevent the associated safety system channel from meeting the minimum performance requirements. Due to their inherent electrical isolation characteristics, fiber optic cables are exempt from electrical isolation qualification testing.

7A.6 Not Used

7A.7 WCAP-16674-P and WCAP-16674-NP, AP1000 I&C Data Communication and Manual Control of Safety Systems and Components

The UFSAR incorporates by reference Tier 2 documents WCAP-16674-P and WCAP-16674-NP, "AP1000 I&C Data Communication and Manual Control of Safety Systems and Components." See Table 1.6-1. WCAP-16674, Revision 4, includes the following revisions and additions as indicated by strikethroughs and underlines.

- Revise the Reference section, as follows:

  1. WCAP-16097-P-A, Rev. ~~0~~ 3 (Proprietary), "Common Qualified Platform Topical Report," Westinghouse Electric Company LLC. ~~(This document is also referred to as CENPD-396-P-A, Revision 2.)~~

* * *

- Revise Section 2.2.3.1.3 Manual Reactor Trip, as follows:

  A manual reactor trip is an entirely hardware based function that is initiated from the MCR by redundant momentary switches. The switches ~~directly~~ interrupt the power from the voting logic, ~~actuating~~ de-energizing the UV interposing relays and trip attachments, and energizing the ST trip attachments in all four divisions. Figure 2-3 illustrates a simplified version of the implementation of the manual reactor trip function.

[INSERT 2]

- Revise Section 2.2.5 Interface and Test Processor Subsystem, as follows:

  * * *

[ ] a,c

- Add Section 2.2.9, “Block to Prevent ADS and IRWST Injection Spurious Acutation” as follows:

  2.2.9 Block to Prevent ADS and IRWST Injection Spurious Actuation

  A number of measures have been taken to reduce the likelihood of spurious actuation of ESF functions in the AP1000 PMS design. Special attention has been given to prevention of spurious Automatic Depressurization System (ADS) and In-Containment Refueling Water Storage Tank (IRWST) Injection valve action, since a spurious actuation could result in a release of reactor coolant to containment. In order to prevent such spurious actuations, an ADS and IRWST Injection Blocking Device is provided that is independent of PMS failure modes. Each division of the PMS contains an independent block that prevents the ADS Stage 1-3 depressurization valves and the arm signal to the ADS Stage 4 depressurization and IRWST Injection valves from being actuated unless there is a confirmatory process condition separate from the PMS ADS and IRWST Injection actuation logic.

  2.2.9.1 Independence

  The ADS and IRWST Injection Blocking Device is a Class 1E module physically located within each of the PMS divisions. The blocking device is diverse from the PMS AC160 hardware and software that is used to create the automatic ADS and IRWST Injection actuation signal, which provides the input to the component interface modules for the ADS and IRWST Injection valves. There are no interdivisional connections between the blocking devices nor will there be any coincidence voting.

  2.2.9.2 Clearing of the ADS and IRWST Injection Block

  The ADS and IRWST Injection Blocking Device uses the CMT level to automatically clear this block. The ADS and IRWST Injection block in each division uses a level signal input from a level sensor on each CMT that clears the block if either signal indicates a CMT is draining. The use of two CMT level sensors in each ADS and IRWST Injection block device provides for a device that does not adversely affect the reliability of the ADS to actuate when it is required. Switches, one for each division, are provided in the MCR to allow the operators to manually clear the ADS blocks. Additionally, inputs from the MCR/ Remote Shutdown Workstation (RSW) transfer switch and from the battery chargers

- Add Section 5.1.8, "ADS Blocking Device" as follows

5.1.8 ADS Blocking Device

The ADS and IRWST Injection Blocking Device design uses conventional analog components that do not rely on software. Apart from its inputs and outputs and power source, the ADS and IRWST Injection Blocking Device does not share other PMS components.

The ADS and IRWST Injection Blocking Device in each division requires the following inputs:

- 4-20 mA inputs from two narrow range upper-level sensors (one on each CMT).
- Contact inputs from one MCR override switch.
- Contact inputs from one MCR/RSW transfer switch.
- Contact inputs from two undervoltage relays from battery chargers.

[

a,c
]

[INSERT 3]

There is inherent conservatism in the use of Figure 15.0.5-2 in that it is based on a skewed flux distribution, which would exist relatively infrequently. For cases other than those associated with unbalanced xenon distributions, significantly more negative reactivity is inserted than that shown in the curve, due to the more favorable axial distribution existing prior to trip.

The normalized RCCA negative reactivity insertion versus time is shown in Figure 15.0.5-3. The curves shown in this figure were obtained from Figures 15.0.5-1 and 15.0.5-2. A total negative reactivity insertion following a trip of 4 percent Δk is assumed in the transient analyses except where specifically noted otherwise. This assumption is conservative with respect to the calculated trip reactivity worth available as shown in Table 4.3-3.

The normalized RCCA negative reactivity insertion versus time curve for an axial power distribution skewed to the bottom (Figure 15.0.5-3) is used in those transient analyses for which a point kinetics core model is used. Where special analyses require use of three-dimensional or axial one-dimensional core models, the negative reactivity insertion resulting from the reactor trip is calculated directly by the reactor kinetics code and is not separable from the other reactivity feedback effects. In this case, the RCCA position versus time of Figure 15.0.5-1 is used as code input.

15.0.6 Protection and Safety Monitoring System Setpoints and Time Delays to Trip Assumed in Accident Analyses

A reactor trip signal acts to open two trip breaker sets connected in series, feeding power to the control rod drive mechanisms. The loss of power to the mechanism coils cause release the RCCAs, which then fall by gravity into the core. There are various in associated with each trip function including delays in signal actuation, in openin and in the release of the rods by the mechanisms. The total delay to trip is defi from the time that trip conditions are reached to the time the rods are free and trip setpoints assumed in accident analyses and the time delay assumed for each trip function are given in Table 15.0-4a. Reference is made in that table to overtemperature and overpower ΔT trip shown in Figure 15.0.3-1.

the protection system is calibrated and surveillances are performed

Table 15.0-4a also summarizes the setpoints and the instrumentation delay for engineered safety features (ESF) functions used in accident analyses. Time delays associated with equipment actuated (such as valve stroke times) by ESF functions are summarized in Table 15.0-4b.

The difference between the limiting setpoint assumed for the analysis and the nominal setpoint represents an allowance for instrumentation channel error and setpoint error. Nominal setpoints are specified in the plant Technical Specifications. During plant startup tests, it is demonstrated that actual instrument time delays are equal to or less than the assumed values. Additionally, ~~protection system channels are calibrated and instrument response times are determined periodically~~ in accordance with the plant Technical Specifications to verify its performance remains within the pre-established limits of the safety analysis.

15.0.7 Instrumentation Drift and Calorimetric Errors, Power Range Neutron Flux

Examples of the instrumentation uncertainties and calorimetric uncertainties used in establishing the power range high neutron flux setpoint are presented in Table 15.0-5.

The calorimetric uncertainty is the uncertainty assumed in the determination of core thermal power as obtained from secondary plant measurements. The total ion chamber current (sum of the top and bottom sections) is calibrated (set equal) to this measured power on a daily basis.

The secondary power is obtained from measurement of feedwater flow, feedwater inlet temperature to the steam generators, and steam pressure. Installed plant instrumentation is used for these measurements.

Inserts for
Vogtle 3 & 4 UFSAR Markups

Insert 1
(Insert for WCAP-15776 Section 3.13)

- Revise Section 3.13, Conformance to the Requirements to Provide Capability for Test and Calibration (Paragraph 5.7 of IEEE 603-1991) as follows:

  Capability for testing and calibrating channels and devices used to derive the final system output signal from the various channel signals is provided. Testing from the sensor inputs of the PMS through to the actuated equipment ~~is~~ can be accomplished through a series of overlapping sequential tests with the majority of the tests capable of being performed with the plant at full power. Where testing final equipment at power would upset plant operation or damage equipment, provisions are made to test the equipment at reduced power or when the reactor is shut down.

  Each division of the PMS includes a test subsystem. The test subsystem provides the capability for verification of the setpoint values and other constants, and verification that proper signals appear at other locations in the system.

  Verification of the signal processing algorithms ~~is made~~ by exercising the test signal sources (either by hardware or software signal injection) and observing the results up to, and including, the attainment of a channel partial trip or actuation signal at the power interface. When required for the test, the tester places the voting logic associated with the channel function under test in bypass.

  The capability for overlapping test sequence continues by inputting digital test signals at the output side of the threshold functions, in combinations necessary to verify the voting logic. Some of the input combinations to the coincidence logic cause outputs such as reactor trips and engineered safety feature (ESF) initiation. The reactor trip circuit breaker arrangement is a two-out-of-four logic configuration, such that the tripping of the two circuit breakers associated with one division does not cause a reactor trip. To reduce wear on the breakers through excessive tripping, and to avoid a potential plant trip resulting from a single failure while testing is in progress, the test sequence is designed so that actual opening of the trip breakers is only required when the breaker itself is being tested.

Insert 2

(Insert for WCAP-16675 Section 2.2.5)

[

.]a,c

Insert 3

(Insert for WCAP-16675 Section 6 and Section 6.2)

- Revise Section 6, Maintenance, Testing, and Calibration as follows:

Maintenance and testing of the PMS consists of two types of tests: self-diagnostic tests and on-line verification tests. The self-diagnostic tests are built into the AC160 equipment and consist of numerous automatic checks to validate that the equipment and software are performing their functions correctly. Self-diagnostics, as well as on-line ~~On-line~~ verification tests ~~are~~ that can be manually initiated are used to verify that the safety system is capable of performing its intended safety function.

- Revise Section 6.2, On-line Verification Tests as follows:

Via the MTP in conjunction with the ITP, the I&C technician can perform manually initiated on-line verification tests to exercise the safety system logic and hardware to verify proper system operation. The ITP and the MTP also provide support for the detection and annunciation of self-diagnostics. Within each PMS division, the ITP interfaces with the NI subsystem, BPL subsystem, LCL subsystem, ILP subsystem, MTP, and the RTCB initiation relays to monitor and test the operational state of the PMS. The ITP together with the MTP provides support for on-line self-diagnostics and testing for the verification of PMS operability ~~overall on-line verification testing~~.

Vogtle 3 & 4
COL Appendix A Technical Specifications
Markups

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
D. Required Action and Associated Completion Time of Condition C not met.	D.1 Be in MODE 3.	15 minutes

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.1.8.1	Perform a COT on power range neutron flux and intermediate range neutron flux channels per SR 3.3.1.6, SR 3.3.1.7, and SR 3.3.3.2.	Prior to initiation of PHYSICS TESTS
SR 3.1.8.2 1	Verify the RCS lowest loop average temperature is ≥ 541°F.	30 minutes
SR 3.1.8.3 2	Verify THERMAL POWER is ≤ 5% RTP.	30 minutes
SR 3.1.8.4 3	Verify SDM is within the limits specified in the COLR.	24 hours

3.2 POWER DISTRIBUTION LIMITS

3.2.3 AXIAL FLUX DIFFERENCE (AFD) (Constant Axial Offset Control (CAOC) Methodology)

LCO 3.2.3 The AFD:

a. Shall be maintained within the target band specified in the COLR about the target flux difference.

b. May deviate outside the target band with THERMAL POWER < 90% RTP, but ≥ 50% RTP, provided AFD is within the acceptable operation limits specified in the COLR and cumulative penalty deviation time is ≤ 1 hour during the previous 24 hours.

c. May deviate outside the target band with THERMAL POWER < 50% RTP.

- NOTES -

1. The AFD shall be considered outside the target band when two or more OPERABLE excore channels indicate AFD to be outside the target band.

2. With THERMAL POWER ≥ 50% RTP, penalty deviation time shall be accumulated on the basis of a 1 minute penalty deviation for each 1 minute of power operation with AFD outside the target band.

3. With THERMAL POWER < 50% RTP and > 15% RTP, penalty deviation time shall be accumulated on the basis of a 0.5 minute penalty deviation for each 1 minute of power operation with AFD outside the target band.

4

4. A total of 16 hours of operation may be accumulated with AFD outside the target band without penalty deviation time during surveillance of Power Range Neutron Flux channels in accordance with SR 3.3.1.5, provided AFD is maintained within acceptable operation limits.

APPLICABILITY: MODE 1 with THERMAL POWER > 15% RTP and with the On-Line Power Distribution Monitoring System (OPDMS) not monitoring parameters.

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
E. As required by Required Action C.1 and referenced in Table 3.3.1-1.	E.1 Reduce THERMAL POWER to < P-10.	6 hours

SURVEILLANCE REQUIREMENTS

- NOTE -

Refer to Table 3.3.1-1 to determine which SRs apply for each RTS Function.

SURVEILLANCE		FREQUENCY
~~SR 3.3.1.1~~	~~Perform CHANNEL CHECK.~~	~~12 hours~~
SR 3.3.1.~~2~~ 1	**- NOTES -** 1. Adjust nuclear instrument channel in the Protection and Safety Monitoring System (PMS) if absolute difference is > 1% RTP. 2. Required to be met within 12 hours after reaching 15% RTP. 3. If the calorimetric heat balance is < 70% RTP, and if the nuclear instrumentation channel indicated power is: a. lower than the calorimetric measurement by > 1%, then adjust the nuclear instrumentation channel upward to match the calorimetric measurement. b. higher than the calorimetric measurement, then no adjustment is required. Compare results of calorimetric heat balance to nuclear instrument channel output.	24 hours

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.3.1.~~3~~ 2	--- **- NOTES -** 1. Adjust the conversion factor, ΔT°, in the ΔT power calculation ($q_{\Delta T}$) if absolute difference between $q_{\Delta T}$ and the calorimetric measurement is > 1% RTP. 2. Required to be met within 12 hours after reaching 50% RTP. 3. If the calorimetric heat balance is < 70% RTP, and if $q_{\Delta T}$ is: a. lower than the calorimetric measurement by > 5%, then adjust ΔT° to match the calorimetric measurement. b. higher than the calorimetric measurement, then no adjustment is required. --- Compare results of calorimetric heat balance to the ΔT power calculation ($q_{\Delta T}$) output.	24 hours
SR 3.3.1.~~4~~ 3	--- **- NOTES -** 1. Adjust nuclear instrument channel in PMS if absolute difference is ≥ 3% AFD. 2. Required to be met within 24 hours after reaching 20% RTP. --- Compare results of the incore detector measurements to nuclear instrument channel AXIAL FLUX DIFFERENCE.	31 effective full power days (EFPD)
SR 3.3.1.~~5~~ 4	--- **- NOTE -** Required to be met within 24 hours after reaching 50% RTP. --- Calibrate excore channels to agree with incore detector measurements.	92 EFPD

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.3.1.6	Perform COT in accordance with Setpoint Program.	92 days
SR 3.3.1.7	-- - NOTE - Only required to be performed when not performed within previous 92 days. -- Perform COT in accordance with Setpoint Program.	Prior to reactor startup AND 4 hours after reducing power below P-10 AND 92 days thereafter
SR 3.3.1.8 5	-- - NOTE - This Surveillance shall include verification that the time constants are adjusted to within limits. -- Perform CHANNEL CALIBRATION in accordance with Setpoint Program.	24 months
SR 3.3.1.9 6	-- - NOTE - Neutron detectors are excluded from CHANNEL CALIBRATION. -- Perform CHANNEL CALIBRATION in accordance with Setpoint Program.	24 months

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.3.1.~~10~~ 7	- NOTE - Verification of setpoint is not required. Perform TADOT.	24 months
SR 3.3.1.~~11~~ 8	- NOTE - Neutron detectors are excluded from response time testing. Verify RTS RESPONSE TIME is within limits.	24 months on a STAGGERED TEST BASIS

Table 3.3.1-1 (page 1 of 2)
Reactor Trip System Instrumentation

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS	CONDITIONS	SURVEILLANCE REQUIREMENTS
1. Power Range Neutron Flux				
a. High Setpoint	1,2	4	D	~~SR 3.3.1.1~~ SR 3.3.1.~~2~~ 1 ~~SR 3.3.1.6~~ SR 3.3.1.~~9~~ 6 SR 3.3.1.~~11~~ 8
b. Low Setpoint	1[(a)],2	4	D	~~SR 3.3.1.1~~ ~~SR 3.3.1.7~~ SR 3.3.1.~~9~~ 6 SR 3.3.1.~~11~~ 8
2. Power Range Neutron Flux High Positive Rate	1,2	4	D	~~SR 3.3.1.6~~ SR 3.3.1.~~9~~ 6 SR 3.3.1.~~11~~ 8
3. Overtemperature ΔT	1,2	4 (2/loop)	D	~~SR 3.3.1.1~~ SR 3.3.1.~~3~~ 2 SR 3.3.1.~~4~~ 3 SR 3.3.1.~~5~~ 4 ~~SR 3.3.1.6~~ SR 3.3.1.~~8~~ 5 SR 3.3.1.~~11~~ 8
4. Overpower ΔT	1,2	4 (2/loop)	D	~~SR 3.3.1.1~~ SR 3.3.1.~~3~~ 2 SR 3.3.1.~~4~~ 3 SR 3.3.1.~~5~~ 4 ~~SR 3.3.1.6~~ SR 3.3.1.~~8~~ 5 SR 3.3.1.~~11~~ 8
5. Pressurizer Pressure				
a. Low 2 Setpoint	1[(b)]	4	E	~~SR 3.3.1.1~~ ~~SR 3.3.1.6~~ SR 3.3.1.~~8~~ 5 SR 3.3.1.~~11~~ 8
b. High 2 Setpoint	1,2	4	D	~~SR 3.3.1.1~~ ~~SR 3.3.1.6~~ SR 3.3.1.~~8~~ 5 SR 3.3.1.~~11~~ 8
6. Pressurizer Water Level – High 3	1[(b)]	4	E	~~SR 3.3.1.1~~ ~~SR 3.3.1.6~~ SR 3.3.1.~~8~~ 5 SR 3.3.1.~~11~~ 8

(a) Below the P-10 (Power Range Neutron Flux) interlocks.
(b) Above the P-10 (Power Range Neutron Flux) interlock.

Table 3.3.1-1 (page 2 of 2)
Reactor Trip System Instrumentation

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS	CONDITIONS	SURVEILLANCE REQUIREMENTS
7. Reactor Coolant Flow – Low 2	1(b)	4 per hot leg	E	~~SR 3.3.1.1~~ SR 3.3.1.~~3~~ 2 ~~SR 3.3.1.6~~ SR 3.3.1.~~8~~ 5 SR 3.3.1.~~11~~ 8
8. Reactor Coolant Pump (RCP) Bearing Water Temperature – High 2	1,2	4 per RCP	D	~~SR 3.3.1.1~~ ~~SR 3.3.1.6~~ SR 3.3.1.~~8~~ 5 SR 3.3.1.~~11~~ 8
9. RCP Speed – Low 2	1(b)	4 (1/pump)	E	~~SR 3.3.1.1~~ ~~SR 3.3.1.6~~ SR 3.3.1.~~8~~ 5 SR 3.3.1.~~11~~ 8
10. Steam Generator (SG) Narrow Range Water Level – Low 2	1,2	4 per SG	D	~~SR 3.3.1.1~~ ~~SR 3.3.1.6~~ SR 3.3.1.~~8~~ 5 SR 3.3.1.~~11~~ 8
11. Steam Generator (SG) Narrow Range Water Level – High 3	1,2(c)	4 per SG	D	~~SR 3.3.1.1~~ ~~SR 3.3.1.6~~ SR 3.3.1.~~8~~ 5 SR 3.3.1.~~11~~ 8
12. Passive Residual Heat Removal Actuation	1,2	4 per valve	D	SR 3.3.1.~~10~~ 7 SR 3.3.1.~~11~~ 8

(b) Above the P-10 (Power Range Neutron Flux) interlock.

(c) Above the P-11 (Pressurizer Pressure) interlock.

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
E. Required Action and associated Completion Time of Condition D not met.	E.1 Intiate action to fully insert all rods. AND E.2 Place the Plant Control System in a condition incapable of rod withdrawal.	1 hour 1 hour
F. Three or more channels inoperable.	F.1 Open reactor trip breakers (RTBs).	Immediately

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
~~SR 3.3.2.1~~	~~Perform CHANNEL CHECK.~~	~~12 hours~~

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
~~SR 3.3.2.2~~	~~- NOTES -~~ ~~1. Only required to be performed when not performed within previous 92 days.~~ ~~2. Not required to be performed prior to entering MODE 3 from MODE 2 until 4 hours after entry into MODE 3.~~ ~~Perform COT in accordance with Setpoint Program.~~	~~Prior to reactor startup~~ ~~AND~~ ~~4 hours after reducing power below P-6~~ ~~AND~~ ~~92 days thereafter~~
SR 3.3.2.~~3~~ 1	- NOTE - Neutron detectors are excluded from CHANNEL CALIBRATION. Perform CHANNEL CALIBRATION in accordance with Setpoint Program.	24 months
SR 3.3.2.~~4~~ 2	- NOTE - Neutron detectors are excluded from response time testing. Verify RTS RESPONSE TIME is within limits.	24 months on a STAGGERED TEST BASIS

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.3.3.1	Perform CHANNEL CHECK.	12 hours
SR 3.3.3.2	- NOTE - Only required to be performed when not performed within previous 92 days. Perform COT in accordance with Setpoint Program.	Prior to reactor startup AND 4 hours after reducing power below P-10 AND 92 days thereafter
SR 3.3.3.3 1	- NOTE - Neutron detectors are excluded from CHANNEL CALIBRATION. Perform CHANNEL CALIBRATION in accordance with Setpoint Program.	24 months
SR 3.3.3.4 2	- NOTE - Neutron detectors are excluded from response time testing. Verify RTS RESPONSE TIME is within limits.	24 months on a STAGGERED TEST BASIS

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
D. Required Action and associated Completion Time of Condition C not met. OR One or more Functions with three or more channels inoperable in MODE 3, 4, or 5.	D.1 Initiate action to fully insert all rods. AND D.2 Place the Plant Control System in a condition incapable of rod withdrawal.	1 hour 1 hour

RTS ESFAS Function the SR applies to.

SURVEILLANCE REQUIREMENTS

- NOTE -
Refer to Table 3.3.4-1 to determine which ~~SRs apply for each RTS ESFAS Function.~~

SURVEILLANCE		FREQUENCY
~~SR 3.3.4.1~~	~~Perform ACTUATION LOGIC TEST.~~	~~92 days~~
SR 3.3.4.~~2~~ 1	Verify RTS RESPONSE TIME is within limit.	24 months on a STAGGERED TEST BASIS

Table 3.3.4-1 (page 1 of 1)
Reactor Trip System Engineered Safety Feature Actuation System Instrumentation

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS	SURVEILLANCE REQUIREMENTS
1. Safeguards Actuation Input from Engineered Safety Feature Actuation System – Automatic	1,2	4	SR 3.3.4.1 ~~SR 3.3.4.2~~
2. ADS Stages 1, 2, and 3 Actuation Input from Engineered Safety Feature Actuation System – Automatic	1,2,3[(a)],4[(a)],5[(a)]	4	~~SR 3.3.4.1~~
3. Core Makeup Tank Actuation Input from Engineered Safety Feature Actuation System – Automatic	1,2,3[(a)],4[(a)],5[(a)]	4	~~SR 3.3.4.1~~

N/A

(a) With Plant Control System capable of rod withdrawal or one or more rods not fully inserted.

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
~~SR 3.3.6.1~~	~~Perform ACTUATION LOGIC TEST.~~	~~92 days~~

There are no SRs.

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
~~SR 3.3.8.1~~	~~Perform CHANNEL CHECK.~~	~~12 hours~~
~~SR 3.3.8.2~~	~~Perform CHANNEL OPERATIONAL TEST (COT) in accordance with Setpoint Program.~~	~~92 days~~
SR 3.3.8.~~3~~ 1	---------- **- NOTE -** This surveillance shall include verification that the time constants are adjusted to within limits. ---------- Perform CHANNEL CALIBRATION in accordance with Setpoint Program.	24 months
SR 3.3.8.~~4~~ 2	---------- **- NOTE -** Not applicable to Function 1.a. ---------- Verify ESF RESPONSE TIME is within limit.	24 months on a STAGGERED TEST BASIS

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
~~SR 3.3.10.1~~	~~Perform CHANNEL CHECK.~~	~~12 hours~~
~~SR 3.3.10.2~~	~~Perform CHANNEL OPERATIONAL TEST (COT) in accordance with Setpoint Program.~~	~~92 days~~
SR 3.3.10.~~3~~ 1	-- **- NOTE -** This surveillance shall include verification that the time constants are adjusted to within limits. -- Perform CHANNEL CALIBRATION in accordance with Setpoint Program.	24 months
SR 3.3.10.~~4~~ 2	Verify ESF RESPONSE TIME is within limit.	24 months on a STAGGERED TEST BASIS

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
~~SR 3.3.11.1~~	~~Perform CHANNEL CHECK.~~	~~12 hours~~
~~SR 3.3.11.2~~	~~Perform CHANNEL OPERATIONAL TEST (COT) in accordance with Setpoint Program.~~	~~92 days~~
SR 3.3.11.~~3~~ 1	-- **- NOTE -** This surveillance shall include verification that the time constants are adjusted to within limits. -- Perform CHANNEL CALIBRATION in accordance with Setpoint Program.	 24 months
SR 3.3.11.~~4~~ 2	Verify ESF RESPONSE TIME is within limit.	24 months on a STAGGERED TEST BASIS

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
~~SR 3.3.13.1~~	~~Perform CHANNEL CHECK.~~	~~12 hours~~
~~SR 3.3.13.2~~	~~Perform CHANNEL OPERATIONAL TEST (COT) in accordance with Setpoint Program.~~	~~92 days~~
SR 3.3.13.~~3~~ 1	-- **- NOTE -** This surveillance shall include verification that the time constants are adjusted to within limits. -- Perform CHANNEL CALIBRATION in accordance with Setpoint Program.	24 months
SR 3.3.13.~~4~~ 2	Verify ESF RESPONSE TIME is within limit.	24 months on a STAGGERED TEST BASIS

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
~~SR 3.3.14.1~~	~~Perform CHANNEL CHECK.~~	~~12 hours~~
~~SR 3.3.14.2~~	~~Perform CHANNEL OPERATIONAL TEST (COT) in accordance with Setpoint Program.~~	~~92 days~~
SR 3.3.14.~~3~~ 1	-- **- NOTE -** This surveillance shall include verification that the time constants are adjusted to within limits. -- Perform CHANNEL CALIBRATION in accordance with Setpoint Program.	24 months
SR 3.3.14.~~4~~ 2	Verify ESF RESPONSE TIME is within limit.	24 months on a STAGGERED TEST BASIS

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
~~SR 3.3.15.1~~	~~Perform ACTUATION LOGIC TEST on ESF Coincidence Logic.~~	~~92 days on a STAGGERED TEST BASIS~~
SR 3.3.15.~~2~~ 1	Perform ACTUATION LOGIC OUTPUT TEST on ESF Actuation.	24 months
SR 3.3.15.~~3~~ 2	--- **- NOTE -** Only required to be met when all four cold leg temperatures are > 275°F. --- Verify pressurizer heater circuit breakers trip open on an actual or simulated actuation signal.	24 months
SR 3.3.15.~~4~~ 3	Verify reactor coolant pump breakers trip open on an actual or simulated actuation signal.	24 months
SR 3.3.15.~~5~~ 4	Verify main feedwater and startup feedwater pump breakers trip open on an actual or simulated actuation signal.	24 months
SR 3.3.15.~~6~~ 5	--- **- NOTE -** Only required to be met in MODES 1 and 2. --- Verify auxiliary spray and purification line isolation valves actuate to the isolation position on an actual or simulated actuation signal.	24 months

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
D. Required Action and associated Completion Time of Condition A not met during movement of irradiated fuel assemblies. <u>OR</u> One or more Functions within two or more required divisions inoperable during movement of irradiated fuel assemblies.	D.1 Suspend movement of irradiated fuel assemblies.	Immediately

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
~~SR 3.3.16.1~~	~~Perform ACTUATION LOGIC TEST on ESF Coincidence Logic.~~	~~92 days on a STAGGERED TEST BASIS~~
SR 3.3.16.~~2~~ 1	Perform ACTUATION LOGIC OUTPUT TEST on ESF Actuation.	24 months
SR 3.3.16.~~3~~ 2	--- **- NOTE -** Only required to be met in MODE 5. --- Verify reactor coolant pump breakers trip open on an actual or simulated actuation signal.	24 months

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.3.16.4 3	-- **- NOTES -** 1. Not required to be met in MODE 5 above the P-12 (Pressurizer Level) interlock. 2. Not required to be met in MODE 6 with water level ≥ 23 feet above the top of the reactor vessel flange. -- Verify CVS letdown isolation valves actuate to the isolation position on an actual or simulated actuation signal.	24 months
SR 3.3.16.5 4	-- **- NOTE -** Only required to be met in MODE 6. -- Verify Spent Fuel Pool Cooling System containment isolation valves actuate to the isolation position on an actual or simulated actuation signal.	24 months

applies

SURVEILLANCE REQUIREMENTS

- NOTE -

SR 3.3.17.1 ~~and SR 3.3.17.2 apply~~ to each PAM instrumentation Function in Table 3.3.17-1.

SURVEILLANCE		FREQUENCY
~~SR 3.3.17.1~~	~~Perform CHANNEL CHECK for each required instrumentation channel that is normally energized.~~	~~31 days~~
SR 3.3.17.~~2~~ 1	- NOTE - Neutron detectors are excluded from CHANNEL CALIBRATION. Perform CHANNEL CALIBRATION.	24 months

3.3 INSTRUMENTATION

3.3.19 Diverse Actuation System (DAS) Manual Controls

LCO 3.3.19 The DAS manual controls for each function in Table 3.3.19-1 shall be OPERABLE.

APPLICABILITY: According to Table 3.3.19-1.

ACTIONS

CONDITION	REQUIRED ACTION		COMPLETION TIME
A. One or more manual DAS controls inoperable.	A.1	Restore DAS manual controls to OPERABLE status.	30 days
B. Required Action and associated Completion Time of Condition A not met for inoperable DAS manual reactor trip control.	B.1	Perform SR 3.3.7.1.	Once per 31 days on a STAGGERED TEST BASIS
	AND		
	B.2	Restore all controls to OPERABLE status.	Prior to entering MODE 2 following next MODE 5 entry
C. Required Action and associated Completion Time of Condition A not met for inoperable DAS manual actuation control other than reactor trip.	~~C.1~~	~~Perform SRs 3.3.15.1 and 3.3.16.1, as applicable.~~	~~Once per 31 days on a STAGGERED TEST BASIS~~
	~~AND~~		
	C.~~2~~ 1	Restore all controls to OPERABLE status.	Prior to entering MODE 2 following next MODE 5 entry

SURVEILLANCE REQUIREMENTS

- NOTE -
Refer to Table 3.3.20-1 to determine which SRs apply for each ADS and IRWST Injection Blocking Device Function.

SURVEILLANCE		FREQUENCY
~~SR 3.3.20.1~~	~~Perform CHANNEL CHECK.~~	~~12 hours~~
SR 3.3.20.~~2~~ 1	Verify each ADS and IRWST Injection Block switch is in the "unblock" position.	7 days
~~SR 3.3.20.3~~	~~Perform CHANNEL OPERATIONAL TEST (COT) in accordance with Setpoint Program.~~	~~92 days~~
SR 3.3.20.~~4~~ 2	Perform CHANNEL CALIBRATION in accordance with Setpoint Program.	24 months
SR 3.3.20.~~5~~ 3	Perform ACTUATION LOGIC TEST of ADS and IRWST Injection Blocking Devices.	24 months
SR 3.3.20.~~6~~ 4	**- NOTE -** Verification of setpoint not required. Perform TRIP ACTUATING DEVICE OPERATIONAL TEST (TADOT) of ADS and IRWST Injection Block manual switches.	24 months
SR 3.3.20.~~7~~ 5	The following SRs of Specification 3.5.2, "Core Makeup Tanks (CMTs) – Operating" are applicable for each CMT: SR 3.5.2.3 SR 3.5.2.6 SR 3.5.2.7	In accordance with applicable SRs

Table 3.3.20-1 (page 1 of 1)
ADS and IRWST Injection Blocking Device

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS PER DIVISION	SURVEILLANCE REQUIREMENTS
1. Core Makeup Tank Level for Automatic Unblocking[a]	1,2,3,4[b]	2	~~SR 3.3.20.1~~ ~~SR 3.3.20.3~~ SR 3.3.20.~~4~~ 2 SR 3.3.20.~~5~~ 3 SR 3.3.20.~~7~~ 5
2. ADS and IRWST Injection Block Switches for Manual Unblocking	1,2,3,4[b]	1	SR 3.3.20.~~5~~ 3 SR 3.3.20.~~6~~ 4
	4[c],5,6	1	SR 3.3.20.~~2~~ 1 SR 3.3.20.~~5~~ 3 SR 3.3.20.~~6~~ 4

(a) Not required to be OPERABLE with associated divisional ADS and IRWST Injection Block switch in the “unblock” position.

(b) With the Reactor Coolant System (RCS) not being cooled by the Normal Residual Heat Removal System (RNS).

(c) With the RCS being cooled by the RNS.

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
~~SR 3.9.3.1~~	~~Perform a CHANNEL CHECK.~~	~~12 hours~~
SR 3.9.3.~~2~~ 1	-------------------- **- NOTE-** Neutron detectors are excluded from CHANNEL CALIBRATION. -------------------- Perform CHANNEL CALIBRATION.	24 months

5.5 Programs and Manuals

5.5.14 Setpoint Program (SP)

a. The Setpoint Program (SP) implements the regulatory requirement of 10 CFR 50.36(c)(1)(ii)(A) that technical specifications will include items in the category of limiting safety system settings (LSSS), which are settings for automatic protective devices related to those variables having significant safety functions.

b. The Nominal Trip Setpoint (NTS), As-Found Tolerance (AFT), and As-Left Tolerance (ALT) for each Technical Specification required automatic protection instrumentation function shall be calculated in conformance with WCAP-16361-P, "Westinghouse Setpoint Methodology for Protection Systems – AP1000," February 2011.

c. For each Technical Specification required automatic protection instrumentation function, performance of a CHANNEL CALIBRATION ~~or CHANNEL OPERATIONAL TEST (COT)~~ surveillance "in accordance with the Setpoint Program" shall include the following:

1. The as-found value of the instrument channel trip setting shall be compared with the previously recorded as-left value.

   i. If the as-found value of the instrument channel trip setting differs from the previously recorded as-left value by more than the pre-defined test acceptance criteria band (i.e., the specified AFT), then the instrument channel shall be evaluated to verify that it is functioning in accordance with its design basis before declaring the surveillance requirement met and returning the instrument channel to service. An Instrument Channel is determined to be functioning in accordance with its design basis if it can be set to within the ALT. This as-found condition shall be entered into the plant's corrective action program.

   ii. If the as-found value of the instrument channel trip setting is less conservative than the specified AFT, the surveillance requirement is not met and the instrument channel shall be immediately declared inoperable.

Select Preliminary Vogtle 3 & 4 Technical Specification Bases Markups

BASES

ACTIONS (continued)

D.1

Condition D is entered from Required Action C.1 when any Required Action and associated Completion Time of Condition A or B is not met, or three or more channels are inoperable for one or more Functions, and it is identified as the appropriate Condition referenced in Table 3.3.1-1. If the channel(s) is not restored to OPERABLE status or placed in trip or bypass, as applicable, within the allowed Completion Time, or three or more channels are inoperable for a Function, the plant must be placed in MODE 3. Six hours are allowed to place the plant in MODE 3. This is a reasonable time, based on operating experience, to reach MODE 3 from full power in an orderly manner and without challenging plant systems.

E.1

Condition E is entered from Required Action C.1 when any Required Action and associated Completion Time of Condition A or B is not met, or three or more channels for one or more Functions are inoperable, and it is identified as the appropriate Condition referenced in Table 3.3.1-1. If the channel(s) is not restored to OPERABLE status or placed in trip or bypass, as applicable, within the allowed Completion Time, or three or more channels are inoperable for a Function, thermal power must be reduced to below the P-10 interlock; a condition in which the LCO does not apply. The allowed Completion Time is reasonable, based on operating experience, to reach the specified condition from full power conditions in an orderly manner and without challenging plant systems.

SURVEILLANCE REQUIREMENTS

The SRs for each RTS Function are identified in the SRs column of Table 3.3.1-1 for that Function.

A Note has been added to the SR table stating that Table 3.3.1-1 determines which SRs apply to which RTS Functions.

is

The CHANNEL CALIBRATION ~~and COT are~~ performed in a manner that is consistent with the assumptions used in analytically calculating the required channel accuracies. ~~For channels that include dynamic transfer functions, such as, lag, lead/lag, rate/lag, the response time test may be performed with the transfer function set to one~~, with the resulting measured response time compared to the appropriate FSAR Chapter 7 response time (Ref. 1). ~~Alternately, the response time test can be performed with the time constants set to their nominal value provided the required response time is analytically calculated assuming the time constants are set at their nominal values. The response time may be measured by a series of overlapping tests such that the entire response time is measured.~~

In lieu of measurement, the response time for the protection and safety monitoring system equipment is based on allocated values. The overall response time may be determined by a series of overlapping tests and allocated values such that the entire response time is measured

BASES

SURVEILLANCE REQUIREMENTS (continued)

The 24 month Frequency is based on the need to perform this Surveillance under the conditions that apply during a plant outage and the potential for an unplanned transient if the Surveillance were performed with the reactor at power. Operating experience has shown these components usually pass the Surveillance when performed on the 24 month Frequency.

SR 3.3.1.~~10~~ 7

This

SR ~~3.3.1.10~~ is the performance of a TADOT of the Passive Residual Heat Removal Actuation valve position indicator contact inputs. This TADOT is performed every 24 months.

The Frequency is based on the known reliability of the Function and the multichannel redundancy available, and has been shown to be acceptable through operating experience.

The SR is modified by a Note that excludes verification of setpoints from the TADOT. The Functions affected have no setpoints associated with them.

SR 3.3.1.~~11~~ 8

This SR ~~3.3.1.11~~ verifies that the individual channel/division actuation response times are less than or equal to the maximum values assumed in the accident analysis. Response Time testing criteria are included in Reference 1.

In lieu of measurement, the response time for the protection and safety monitoring system equipment is based on allocated values. The overall response time may be determined by a series of overlapping tests and allocated values such that the entire response time is measured

~~For channels that include dynamic transfer Functions (e.g., lag, lead/lag, rate/lag, etc.), the response time test may be performed with the transfer Function set to one~~, with the resulting measured response time compared to the appropriate FSAR Chapter 7 response time. ~~Alternately, the response time test can be performed with the time constants set to their nominal value, provided the required response time is analytically calculated assuming the time constants are set at their nominal values. The response time may be measured by a series of overlapping tests such that the entire response time is measured.~~

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

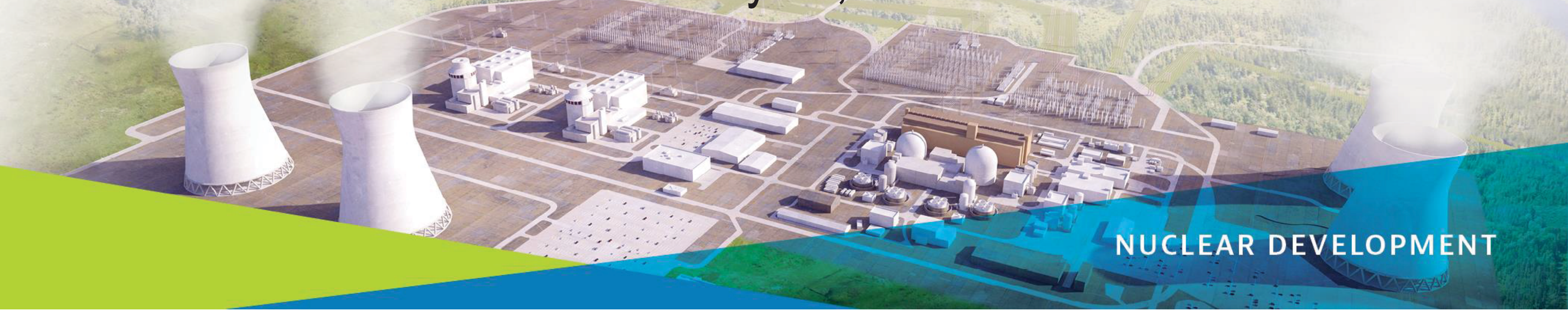
Allocations for signal processing and actuation logic response times may be obtained from the protection and safety monitoring system functional requirements.

VOGTLE UNITS 3&4

Georgia Power   Southern Nuclear

PMS TS Surveillance LAR
Technical Exchange Meeting

January 24, 2019



NUCLEAR DEVELOPMENT

Meeting Purpose

- Discuss the proposed changes to the VEGP 3&4 PMS TS surveillance requirements (SRs)
- Discuss preliminary analysis results of application of Westinghouse methodology evaluating each SR type (see handout APP-GW-GLR-185, *Preliminary Information to Support NRC Technical Exchange Meeting on Protection and Safety Monitor System Surveillance Reduction*)
- Receive and address Staff feedback

Agenda

- Background
- LAR Purpose Statement
- Proposed licensing basis
- LAR preparation status
- Summary

Background

- VEGP Units 3 & 4 instrumentation Technical Specifications (TS) based on Standard TS for analog protection systems
- Protection and Safety Monitoring System (PMS) uses the Westinghouse Common Q platform which is a digital platform
- Westinghouse Common Q NRC-generically approved WCAP-16097-P-A SER describes the Common Q diagnostic features

Background *(cont'd)*

Fully leveraging the continuous, self-diagnostic testing features of the PMS digital protection system to reduce the scope/frequency of manual TS surveillance testing would:

- Increase safety by lowering operational risk associated with human performance errors
- Reduce the duration of how long the PMS is at less than full redundancy
- Reduce resources necessary to perform surveillances, and
- Save substantial operational costs and still meet regulation

Background *(cont'd)*

- VEGP 3&4 intends to submit a LAR to revise/eliminate select PMS TS SR manual testing by crediting digital self-diagnostic features
- Westinghouse performing analysis to evaluate whether the self-diagnostic features can replace the current surveillance tests
- Analysis shows that the self-diagnostics provide continuous coverage

LAR Purpose Statement

- Current PMS TS SRs were not designed for a digital protection system
- Self-diagnostic capabilities of a digital protection system provide sufficient testing to assure that the necessary quality of systems and components is maintained, that facility operation will be within safety limits, and that the limiting conditions for operation will be met
- This allows for elimination and/or reduction of select VEGP TS PMS surveillance tests

PROPOSED LICENSING BASIS

Credit PMS Self-diagnosis

Crediting continuous self-diagnostic features allow for the elimination of most of the PMS manual surveillance testing required for TS compliance:

- Elimination of Channel Check
- Elimination of Channel Operational Tests (COTs)
- Elimination of Actuation Logic Test (ALT)
- Elimination of scope of Response Time Test

PMS SR Testing

PMS equipment functionality maintained by:

- Remaining manual TS surveillance testing
- Continuously running, hardware and software self-diagnostic features

Proposed Technical Specifications (TS)

- See separate handout of current TS

LAR PREPARATION STATUS

Technical Evaluation Status

- Evaluation complete for:
  - Channel Check,
  - COT,
  - ALT, and
  - RTT
- See handout APP-GW-GLR-185 for details

Technical Evaluation Status

Evaluation for Actuation Logic Output Test (ALOT) in progress:

- Preliminary results indicate that not all failures are detectable by self-diagnostics
- While scope of the ALOT may be reduced, the ALOT will remain for select components

Regulatory Evaluation Status

Evaluation for self-diagnostic's compliance with regulatory requirements complete:

- GDCs 18, 21
- Criterion XI, "Test Control," of 10 CFR 50 Appendix B
- IEEE 603-1991
- IEEE 338-1987
- 10 CFR 50.36

Summary

Proposed VEGP 3&4 TS surveillance testing changes meet regulatory requirements and assure that the necessary quality of systems and components is maintained, that facility operation will be within safety limits, and that the limiting conditions for operation will be met.

Questions & Discussion

VOGTLE UNITS 3&4

Georgia Power Southern Nuclear

NUCLEAR DEVELOPMENT

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CAW-19-4852

January 17, 2019

APPLICATION FOR WITHHOLDING PROPRIETARY INFORMATION FROM PUBLIC DISCLOSURE

Subject: Preliminary Information to Support NRC Technical Exchange Meeting on Protection and Safety Monitor System Surveillance Reduction (Proprietary)

The Application for Withholding Proprietary Information from Public Disclosure is submitted by Westinghouse Electric Company LLC ("Westinghouse"), pursuant to the provisions of paragraph (b)(1) of Section 2.390 of the Nuclear Regulatory Commission's ("Commission's") regulations. It contains commercial strategic information proprietary to Westinghouse and customarily held in confidence.

The proprietary information for which withholding is being requested in the above-referenced report is further identified in Affidavit CAW-19-4852 signed by the owner of the proprietary information, Westinghouse. The Affidavit, which accompanies this letter, sets forth the basis on which the information may be withheld from public disclosure by the Commission and addresses with specificity the considerations listed in paragraph (b)(4) of 10 CFR Section 2.390 of the Commission's regulations.

Accordingly, this letter authorizes the utilization of the accompanying Affidavit by Southern Nuclear Company.

Correspondence with respect to the proprietary aspects of the Application for Withholding or the Westinghouse Affidavit should reference CAW-19-4852, and should be addressed to Camille T. Zozula, Manager, Infrastructure & Facilities Licensing, Westinghouse Electric Company, 1000 Westinghouse Drive, Building 2, Suite 259, Cranberry Township, Pennsylvania 16066.

Jill S. Monahan, Manager
Licensing Inspections and Special Programs

Enclosures:

1. Affidavit CAW-19-4852
2. Proprietary Information Notice and Copyright Notice
3. Preliminary Information to Support NRC Technical Exchange Meeting on Protection and Safety Monitor System Surveillance Reduction

CAW-19-4852

Enclosure 1 - AFFIDAVIT

COMMONWEALTH OF PENNSYLVANIA:

ss

COUNTY OF BUTLER:

I, Jill S. Monahan, am authorized to execute this Affidavit on behalf of Westinghouse Electric Company LLC ("Westinghouse") and declare that the averments of fact set forth in this Affidavit are true and correct to the best of my knowledge, information, and belief.

Executed on: 1/17/2019

Jill S. Monahan

Jill S. Monahan, Manager
Licensing Inspections and Special Programs

(1) I am Manager, Licensing Inspections and Special Programs, Westinghouse Electric Company LLC ("Westinghouse"), and as such, I have been specifically delegated the function of reviewing the proprietary information sought to be withheld from public disclosure in connection with nuclear power plant licensing and rule making proceedings, and am authorized to apply for its withholding on behalf of Westinghouse.

(2) I am making this Affidavit in conformance with the provisions of 10 CFR Section 2.390 of the Nuclear Regulatory Commission's ("Commission's") regulations and in conjunction with the Westinghouse Application for Withholding Proprietary Information from Public Disclosure accompanying this Affidavit.

(3) I have personal knowledge of the criteria and procedures utilized by Westinghouse in designating information as a trade secret, privileged or as confidential commercial or financial information.

(4) Pursuant to the provisions of paragraph (b)(4) of Section 2.390 of the Commission's regulations, the following is furnished for consideration by the Commission in determining whether the information sought to be withheld from public disclosure should be withheld.

(i) The information sought to be withheld from public disclosure is owned and has been held in confidence by Westinghouse.

(ii) The information is of a type customarily held in confidence by Westinghouse and not customarily disclosed to the public. Westinghouse has a rational basis for determining the types of information customarily held in confidence by it and, in that connection, utilizes a system to determine when and whether to hold certain types of information in confidence. The application of that system and the substance of that system constitute Westinghouse policy and provide the rational basis required.

Under that system, information is held in confidence if it falls in one or more of several types, the release of which might result in the loss of an existing or potential competitive advantage, as follows:

(a) The information reveals the distinguishing aspects of a process (or component, structure, tool, method, etc.) where prevention of its use by any of

Westinghouse's competitors without license from Westinghouse constitutes a competitive economic advantage over other companies.

(b) It consists of supporting data, including test data, relative to a process (or component, structure, tool, method, etc.), the application of which data secures a competitive economic advantage (e.g., by optimization or improved marketability).

(c) Its use by a competitor would reduce his expenditure of resources or improve his competitive position in the design, manufacture, shipment, installation, assurance of quality, or licensing a similar product.

(d) It reveals cost or price information, production capacities, budget levels, or commercial strategies of Westinghouse, its customers or suppliers.

(e) It reveals aspects of past, present, or future Westinghouse or customer funded development plans and programs of potential commercial value to Westinghouse.

(f) It contains patentable ideas, for which patent protection may be desirable.

(iii) There are sound policy reasons behind the Westinghouse system which include the following:

(a) The use of such information by Westinghouse gives Westinghouse a competitive advantage over its competitors. It is, therefore, withheld from disclosure to protect the Westinghouse competitive position.

(b) It is information that is marketable in many ways. The extent to which such information is available to competitors diminishes the Westinghouse ability to sell products and services involving the use of the information.

(c) Use by our competitor would put Westinghouse at a competitive disadvantage by reducing his expenditure of resources at our expense.

(d) Each component of proprietary information pertinent to a particular competitive advantage is potentially as valuable as the total competitive advantage. If competitors acquire components of proprietary information, any one component may be the key to the entire puzzle, thereby depriving Westinghouse of a competitive advantage.

(e) Unrestricted disclosure would jeopardize the position of prominence of Westinghouse in the world market, and thereby give a market advantage to the competition of those countries.

(f) The Westinghouse capacity to invest corporate assets in research and development depends upon the success in obtaining and maintaining a competitive advantage.

(iv) The information is being transmitted to the Commission in confidence and, under the provisions of 10 CFR Section 2.390, is to be received in confidence by the Commission.

(v) The information sought to be protected is not available in public sources or available information has not been previously employed in the same original manner or method to the best of our knowledge and belief.

(vi) The proprietary information sought to be withheld in this submittal is that which is appropriately marked in APP-GW-GLR-184, "Preliminary Information to Support NRC Technical Exchange Meeting on Protection and Safety Monitor System Surveillance Reduction" (Proprietary), for submittal to the Commission, being transmitted by Southern Nuclear Company letter. The proprietary information as submitted by Westinghouse is that associated with Protection and Safety Monitoring System (PMS) Technical Specification simplification project, and may be used only for that purpose.

(a) This information is part of that which will enable Westinghouse to manufacture and deliver products to utilities based on proprietary designs.

(b) Further, this information has substantial commercial value as follows:

(i) Westinghouse plans to sell the use of similar information to its customers for the purpose of licensing of new nuclear power stations.

(ii) Westinghouse can sell support and defense of industry guidelines and acceptance criteria for plant-specific applications.

(iii) The information requested to be withheld reveals the distinguishing aspects of a methodology which was developed by Westinghouse.

Public disclosure of this proprietary information is likely to cause substantial harm to the competitive position of Westinghouse because it would enhance the ability of competitors to provide similar technical evaluation justifications and licensing defense services for commercial power reactors without commensurate expenses. Also, public disclosure of the information would enable others to use the information to meet NRC requirements for licensing documentation without purchasing the right to use the information.

The development of the technology described in part by the information is the result of applying the results of many years of experience in an intensive Westinghouse effort and the expenditure of a considerable sum of money.

In order for competitors of Westinghouse to duplicate this information, similar technical programs would have to be performed and a significant manpower effort, having the requisite talent and experience, would have to be expended.

Further the deponent sayeth not.

Enclosure 2 - Proprietary Information Notice and Copyright Notice

PROPRIETARY INFORMATION NOTICE

Transmitted herewith are proprietary and non-proprietary versions of a document, furnished to the NRC in connection with requests for generic and/or plant-specific review and approval.

In order to conform to the requirements of 10 CFR 2.390 of the Commission's regulations concerning the protection of proprietary information so submitted to the NRC, the information which is proprietary in the proprietary versions is contained within brackets, and where the proprietary information has been deleted in the non-proprietary versions, only the brackets remain (the information that was contained within the brackets in the proprietary versions having been deleted). The justification for claiming the information so designated as proprietary is indicated in both versions by means of lower case letters (a) through (f) located as a superscript immediately following the brackets enclosing each item of information being identified as proprietary or in the margin opposite such information. These lower case letters refer to the types of information Westinghouse customarily holds in confidence identified in Sections (4)(ii)(a) through (4)(ii)(f) of the Affidavit accompanying this transmittal pursuant to 10 CFR 2.390(b)(1).

COPYRIGHT NOTICE

The reports transmitted herewith each bear a Westinghouse copyright notice. The NRC is permitted to make the number of copies of the information contained in these reports which are necessary for its internal use in connection with generic and plant-specific reviews and approvals as well as the issuance, denial, amendment, transfer, renewal, modification, suspension, revocation, or violation of a license, permit, order, or regulation subject to the requirements of 10 CFR 2.390 regarding restrictions on public disclosure to the extent such information has been identified as proprietary by Westinghouse, copyright protection notwithstanding. With respect to the non-proprietary versions of these reports, the NRC is permitted to make the number of copies beyond those necessary for its internal use which are necessary in order to have one copy available for public viewing in the appropriate docket files in the public document room in Washington, DC and in local public document rooms as may be required by NRC regulations if the number of copies submitted is insufficient for this purpose. Copies made by the NRC must include the copyright notice in all instances and the proprietary notice if the original was identified as proprietary.