Southern Nuclear Operating Company

ND-19-0677

Enclosure 2

Vogtle Electric Generating Plant (VEGP) Units 3 and 4

Proposed Changes to the Licensing Basis Documents

(LAR-19-011)

Note:
Added text is shown as Blue Underline
Deleted text is shown as ~~Red Strikethrough~~
Relocated text is show in Green Underline ~~and Strikethrough~~
Omitted text is shown as three asterisks (*...*...*)

(This Enclosure consists of 8 pages, including this cover page)

COL Changes

Combined License Condition 2.D.(4), *Initial criticality and Low-Power Testing* – Revise information related to the Natural Circulation Test (first plant test) performed as part of the initial criticality and low-power testing.

(4) Initial Criticality and Low-Power Testing

(a) Upon submission of the notification required by Section 2.D.(3)(e) of this license, SNC is authorized to operate the facility at reactor steady-state core power levels not to exceed 5-percent thermal power in accordance with the conditions specified herein;

(b) SNC shall perform the initial criticality and low-power tests identified in UFSAR Sections 14.2.10.2 and 14.2.10.3, respectively~~, the Natural Circulation (first plant test) identified in UFSAR Section 14.2.10.3.6, with the requirements of Technical Specifications 3.4.4 allowed to be suspended during performance of the Natural Circulation (first plant test)~~;

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Combined License Condition 2.D.(5), *Power Ascension Testing* – Revise information related to the Rod Cluster Control Assembly Out of Bank Measurements (first plant test), the Load Follow Demonstration (first plant test), and the Passive Residual Heat Removal Heat Exchanger (first plant test) performed as part of the power ascension testing.

(5) Power Ascension Testing

(a) Upon submission of the notification required by Section 2.D.(4)(d) of this license, SNC is authorized to operate the facility at reactor steady-state core power levels not to exceed 100-percent thermal power in accordance with the conditions specified herein, but only for the purpose of performing power ascension testing;

(b) SNC shall perform the power ascension tests identified in UFSAR Section 14.2.10.4~~, the Rod Cluster Control Assembly Out of Bank Measurements (first plant test) identified in UFSAR Section 14.2.10.4.6, the Load Follow Demonstration (first plant test) identified in UFSAR Section 14.2.10.4.22, and the Passive Residual Heat Removal Heat Exchanger (first plant test) identified in UFSAR Section 14.2.10.4.29~~;

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UFSAR Tier 2 and Tier 2* Changes

Revise text as shown below for UFSAR Subsection 14.2.5, *Utilization of Reactor Operating and Testing Experience in the Development of Initial Test Program.*

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Natural Circulation Test (Steam Generator) (14.2.10.3.6)

This first plant only test was completed at the first AP1000 unit. This test is not required to be conducted at Vogtle Units 3 & 4.

Natural circulation test using the steam generators is performed at low core power during the startup test phase of the initial test program for the first AP1000. This testing of the heat removal system meets the intent of the requirement to perform natural circulation testing and the results of this testing is factored into the operator training as discussed in Subsection 1.9.4, Item I.G.1. This test is only required to be performed once because its purpose is to obtain data to benchmark the operator training simulator.

Rod Cluster Control Assembly Out of Bank Measurements (14.2.10.4.6)

This first plant only test was completed at the first AP1000 unit. This test is not required to be conducted at Vogtle Units 3 & 4.

Rod cluster control assembly out of bank measurements are performed during power ascension tests. The test is performed at the 30-percent to 50-percent power level, so the plant does not exceed peaking factor limits. The test is required to be performed only for the first plant because its purpose is to validate calculation tools and instrument responses.

Load Follow Demonstration (14.2.10.4.22)

This first plant only test was completed at the first AP1000 unit. This test is not required to be conducted at Vogtle Units 3 & 4.

A load follow demonstration test is not required by Regulatory Guide 1.68. However, the AP1000 performs load follow with grey rods, as opposed to current Westinghouse PWRs which manipulate RCS boron concentration to perform load follow operations. Therefore, Westinghouse has included a load follow test for the first AP1000, to demonstrate the ability of the AP1000 plant to load follow.

Natural Circulation Test (Passive Residual Heat Removal Heat Exchanger) (14.2.10.4.29)

This first plant only test was completed at the first AP1000 unit. This test is not required to be conducted at Vogtle Units 3 & 4.

Natural circulation test using the passive residual heat removal heat exchanger is performed using decay heat during the power ascension test phase of the initial test program for the first AP1000. This testing of the heat removal system meets the intent of the requirements to perform natural circulation testing and the results of this testing are factored into the operator training as

discussed in Subsection 1.9.4, Item I.G.1. This test is only required to be performed once because its purpose is to obtain data to benchmark the operator training simulator.

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Revise text as shown below for UFSAR Subsection 14.2.10, *Startup Test Procedures*.

14.2.10.3.6 Natural Circulation (First Plant Only)

This first plant only test was completed at the first AP1000 unit. This test is not required to be conducted at Vogtle Units 3 & 4.

~~**Objective**~~

~~Demonstrate that core decay heat can be removed by the steam generators under the conditions of natural circulation (no reactor coolant pumps operating).~~

~~**Prerequisites**~~

- ~~The reactor is critical, and the neutron flux level is within the range for low-power physics testing~~
- ~~The neutron flux level and reactor coolant system boron concentration and temperature are stable, and the controlling rod bank is positioned in such a way that an increase in core power level to approximately 3 percent can be achieved by rod motion alone~~
- ~~Reactor coolant pumps are operating~~
- ~~The reactivity computer is installed, checked out, and operational, with input flux signals representative of the core average neutron flux level~~
- ~~Instrumentation and data collection equipment is operational and available for logging plant data~~
- ~~Special instrumentation is available to measure vessel ΔT with high precision at low-power levels~~

~~**Test Method**~~

- ~~Because this test is performed at beginning of life when the core fission product density is low, decay heat is simulated by reactor power~~
- ~~By control rod motion, increase reactor power to approximately 3 percent of full power based on predictions of vessel ΔT at full power~~
- ~~With reactor coolant pumps running, obtain data for correlating nuclear flux level and loop temperatures with power~~
- ~~Trip all reactor coolant pumps. Maintain core power at approximately 3 percent by control rod motion while cold leg temperatures remain relatively constant.~~
- ~~Verify natural circulation by observing the response of the hot leg temperature in each loop. The plant is stable under natural circulation at this power level when hot leg temperature is constant.~~

- ~~Obtain data characterizing the plant under natural circulation conditions~~
- ~~Restart reactor coolant pumps only after the reactor is shut down and isothermal conditions are re-established~~

~~**Performance Criterion**~~

~~The measured average vessel ΔT under natural circulation conditions is equal to or less than limiting design predictions for the measured reactor power level as specified in the applicable design specifications.~~

14.2.10.4.6 Rod Cluster Control Assembly Out of Bank Measurements (First Plant Only)

This first plant only test was completed at the first AP1000 unit. This test is not required to be conducted at Vogtle Units 3 & 4.

~~**Objectives**~~

- ~~Demonstrate the sensitivity of the incore and excore instrumentation system to rod cluster control assembly (RCCA) misalignments~~
- ~~Demonstrate the design conservatism for predicted power distributions with a fully misaligned rod cluster control assembly~~
- ~~Monitor the power distribution following the recovery of a misaligned rod cluster control assembly~~

~~**Prerequisites**~~

- ~~The reactor is operating between 30 and 50 percent of full licensed power and has been at that power for a sufficient time to reach xenon equilibrium.~~
- ~~The reactor power level, reactor coolant system boron concentration, and temperature are stable.~~
- ~~The control and shutdown banks are positioned as required for the specific measurement, near fully withdrawn for rod cluster control assembly insertion, and at their respective insertion limits for rod cluster control assembly withdrawal.~~

~~**Test Method**~~

- ~~For the rod cluster control assembly insertion, insert a group of selected rod cluster control assemblies, one at a time, first to the limit of misalignment specified in Subsection 15.0.5, then fully inserted, and finally restored to the bank position. Compensate for reactivity changes by dilution and boration as required.~~
- ~~For the rod cluster control assembly withdrawal, withdraw one or more selected rod cluster control assemblies, one at a time, to the fully withdrawn position. Compensate for reactivity changes by boration and dilution as required.~~
- ~~Record incore and excore instrumentation signals to determine their response and to determine the power distribution and power peaking factors prior to rod cluster control assembly misalignment, at partial misalignment, at full misalignment, and periodically after restoration to normal.~~

~~**Performance Criteria**~~

- ~~Measured power distributions and power peaking factors are within Technical Specification limits and are consistent with the predictions.~~
- ~~The sensitivity of the incore and excore instrumentation to rod cluster control assembly misalignment is demonstrated by examination of the power distribution and power peaking factors measured for each misalignment.~~

14.2.10.4.22 Load Follow Demonstration (First Plant Only)

This first plant only test was completed at the first AP1000 unit. This test is not required to be conducted at Vogtle Units 3 & 4.

~~**Objective**~~

- ~~Demonstrate the ability of the AP1000 plant to follow a design basis daily load follow cycle.~~
- ~~Demonstrate the ability of the plant to respond to grid frequency changes while in the load follow cycle.~~

~~**Prerequisites**~~

- ~~The plant is operating at a stable power level of approximately 100 percent power and has been at that power for a sufficient length of time to have reached an equilibrium xenon condition.~~
- ~~Startup testing of the reactor and turbine control and protection systems are completed, and final setpoints are installed.~~
- ~~The incore instrumentation system, including signal processing software, is operational. All preoperational and startup testing is completed.~~
- ~~Instrumentation and data collection equipment is operational and available for logging plant data.~~

~~**Test Method**~~

- ~~Prior to any load reduction, obtain thermal power measurement and statepoint data along with incore power distribution maps to serve as the reference plant condition.~~
- ~~Using normal plant procedures, reduce turbine load at a rate such that a reactor thermal power level of approximately 50 percent is achieved linearly in 2 hours.~~
- ~~After remaining at 50 percent rated thermal power for more than 2 hours but less than 10 hours, increase turbine load at a rate such that a reactor power level of approximately 100 percent rated thermal power is achieved linearly in 2 hours.~~
- ~~At selected times during the power decrease, while at reduced power, during the power increase, and after reaching approximately full rated thermal power, obtain data from both incore and excore instrumentation to monitor plant performance.~~
- ~~While within the load-follow maneuver, demonstrate the ability to respond to grid frequency~~

changes by increasing and decreasing load by as much as 10 percent, at a rate of 2 percent per minute.

Performance Criteria

- Core power distribution limits, as specified in the plant Technical Specifications, are not exceeded when the plant power is varied according to the design basis load-follow cycle, or while in the cycle, responding to load changes simulating grid frequency changes.
- Load follow maneuvers, including response to grid frequency changes, can be accomplished without changes to the reactor coolant boron concentration.

14.2.10.4.29 Passive Residual Heat Removal Heat Exchanger (First Plant Only)

This first plant only test was completed at the first AP1000 unit. This test is not required to be conducted at Vogtle Units 3 & 4.

Objective

[*Demonstrate the heat removal capability of the passive residual heat removal heat exchanger with the reactor coolant system at prototypic temperatures and natural circulation conditions.*]*

Prerequisites

- The reactor has operated for sufficient time to generate decay heat necessary to perform the test.
- The reactor is in MODE 3.
- Reactor coolant pumps are running.
- Instrumentation and data collection equipment is operational and available for logging plant data.
- Special instrumentation is available to measure the reactor vessel ΔT with high precision at low power levels.
- The passive residual heat removal heat exchanger inlet and outlet temperature instrumentation and heat exchanger flow instrumentation are calibrated and operational.
- The passive residual heat exchanger inlet isolation valve is operational and in its open position, and the heat exchanger outlet isolation valves are operational and in their closed position.
- The startup feedwater system and controls are operating properly to maintain the steam generator secondary side water levels.
- The steam generator steam dump system is operating properly to maintain steam generator pressure so that the reactor coolant system cold leg fluid is at its expected temperature.
- The chemical volume control system auxiliary spray and letdown flow path are operable for

~~controlling the pressurizer pressure and level, respectively after the reactor coolant pumps are shutoff.~~

~~**Test Method**~~

- ~~[*Verify reactor is in MODE 3 at normal operating pressure and temperature.*~~
- ~~*Trip the running reactor coolant pumps.*~~
- ~~*Verify natural circulation commences with decay heat being removed by the steam generators.*~~
- ~~*Initiate flow through the passive residual heat removal heat exchanger by slowly opening one of the two parallel heat exchanger outlet isolation valves until it is fully open.*~~
- ~~*The steam generator steam dump will automatically reduce heat removal by the steam generators in response to passive residual heat exchanger operation.*~~
- ~~*Obtain heat exchanger flow and inlet/outlet temperature data to characterize the heat removal capability of the heat exchanger and heatup of the in-containment refueling water storage tank water with one of two parallel isolation valves open.*~~
- ~~*Close the open heat exchanger isolation valve to terminate the heat exchanger test. The steam generator steam dump should automatically maintain the reactor coolant system fluid average temperature constant. Note that operation of the passive residual heat exchanger shall be terminated before the in-containment refueling water storage tank average water temperature exceeds 120°F.*~~
- ~~*Restart reactor coolant pumps only after the reactor is shutdown and isothermal conditions are re-established.*]*~~

~~**Performance Criteria**~~

~~[*The measured passive residual heat exchanger heat removal rate is equal to or greater than the heat removal rate predicted by the methodology used in the safety analyses at the measured hot leg and in-containment refueling water temperatures.*]*~~