

Vogle PEmails

From: Habib, Donald
Sent: Monday, April 15, 2019 10:39 AM
To: Vogtle PEmails
Subject: ADS Blowdown First 3 Plant Draft LAR for Presubmittal Meeting on 4/18
Attachments: LAR-19-XX Crediting Previously Completed ADS Blowdown First Three Plant Tests DRAFT.pdf

From: Leighty, Steven <sleighty@southernco.COM>
Sent: Friday, April 05, 2019 12:45 PM
To: Patel, Chandu <Chandu.Patel@nrc.gov>
Cc: Habib, Donald <Donald.Habib@nrc.gov>; Roberts, Kelli Anne <KROBERTS@southernco.com>; Agee, Stephanie Y. <SYAGEE@southernco.com>
Subject: [External_Sender] ADS Blowdown First 3 Plant Draft LAR for Presubmittal Meeting on 4/18

Chandu,

Attached is the draft of the LAR to credit the ADS Blowdown First Three Plant Tests in support of a presubmittal meeting on April 18. There is no proprietary information contained within the LAR. We will be uploading the technical documents in support of the LAR to the reading room similar to how we did for the previous LAR on First Plant Testing. We will have them uploaded next week.

Even though the LAR is not proprietary, we expect to discuss proprietary information during the meeting and will need a closed portion. We plan to attend the meeting in person.

Please let me know if there are any questions.

Thanks,

Steve Leighty

Licensing Supervisor, Vogtle 3&4
Southern Nuclear
7825 River Road
Waynesboro, GA 30830
Desk. 706.848.6790
Cell. 724.570.9412
southernnuclear.com



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Created By: Donald.Habib@nrc.gov

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"Vogtle PEmails" <Vogtle.PEmails@nrc.gov>
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Southern Nuclear Operating Company
Vogtle Electric Generating Plant Units 3 and 4
Request for License Amendment:
Crediting Previously Completed ADS Blowdown First Three Plant Tests (LAR-19-XXX)

Ladies and Gentlemen:

Pursuant to 10 CFR 52.98(c) and in accordance with 10 CFR 50.90, Southern Nuclear Operating Company (SNC), the licensee for Vogtle Electric Generating Plant (VEGP) Units 3 and 4, requests an amendment to Combined License Numbers NPF-91 and NPF-92, for VEGP Units 3 and 4, respectively. The requested amendment includes changes to the Updated Final Safety Analysis Report (UFSAR) in the form of departures from the incorporated plant-specific Design Control Document (DCD) Tier 2* and Tier 2 information and related changes to the VEGP Units 3 and 4 COL.

The requested amendment includes changes to credit the previously completed Automatic Depressurization System (ADS) Blowdown first three plant tests as described in the licensing basis documents, including COL Condition 2.D.(2)(a). Because the proposed changes impact the Combined License and plant-specific Tier 2* information, this activity has been determined to require prior NRC approval.

Enclosure 1 provides the description, technical evaluation, regulatory evaluation (including the significant hazards consideration), and environmental considerations for the proposed changes.

Enclosure 2 provides the proposed changes to the licensing basis documents.

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

SNC requests NRC staff review and approval of the license amendment request (LAR) no later than October 30, 2019. Approval by this date will allow sufficient time to implement licensing basis changes necessary to support procurement activities for the ADS Blowdown first three plant test. SNC expects to implement the proposed amendment within thirty days of approval of the LAR.

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

Should you have any questions, please contact Mr. Steven Leighty at (706) 848-6790.

I declare under penalty of perjury that the foregoing is true and correct.
Executed on the XX of April 2019.

Respectfully submitted,

SOUTHERN NUCLEAR OPERATING COMPANY

Michael J. Yox
Regulatory Affairs Director
Vogtle 3 & 4

MJY/PSF/sfr

- Enclosures: 1) Vogtle Electric Generating Plant (VEGP) Units 3 and 4 – Request for License Amendment: Crediting Previously Completed ADS Blowdown First Three Plant Tests (LAR-19-XXX)
- 2) Vogtle Electric Generating Plant (VEGP) Units 3 and 4 – Proposed Changes to the Licensing Basis Documents (LAR-19-XXX)

cc:

Southern Nuclear Operating Company / Georgia Power Company

Mr. S. E. Kuczynski (w/o enclosures)
Mr. D. G. Bost (w/o enclosures)
Mr. M. D. Meier (w/o enclosures)
Mr. D. H. Jones (w/o enclosures)
Mr. J. B. Klecha
Mr. G. Chick
Mr. D. L. McKinney (w/o enclosures)
Mr. T. W. Yelverton (w/o enclosures)
Mr. B. H. Whitley
Ms. C. A. Gayheart
Mr. C. R. Pierce
Ms. A. G. Aughtman
Mr. D. L. Fulton
Mr. M. J. Yox
Mr. C. T. Defnall
Mr. J. Tupik
Mr. W. A. Sparkman
Ms. A. C. Chamberlain
Mr. S. Leighty
Mr. E. Riffle
Ms. K. Roberts
Mr. J. Haswell
Mr. J. Andrews
Document Services RTYPE: VND.LI.L00
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Nuclear Regulatory Commission

Mr. W. Jones (w/o enclosures)
Ms. J. Dixon-Herrity
Mr. C. Patel
Ms. J. M. Heisserer
Mr. B. Kemker
Mr. G. Khouri
Ms. S. Temple
Mr. F. Brown
Mr. C. J. Even
Mr. A. Lerch
Mr. S. Walker

State of Georgia

Mr. R. Dunn

Oglethorpe Power Corporation

Mr. M. W. Price
Ms. A. Whaley

Municipal Electric Authority of Georgia

Mr. J. E. Fuller
Mr. S. M. Jackson

Dalton Utilities

Mr. T. Bundros

Westinghouse Electric Company, LLC

Mr. L. Oriani (w/o enclosures)
T. Rubenstein (w/o enclosures)
Mr. M. Corletti
Mr. M. L. Clyde
Mr. D. Hawkins
Mr. J. Coward

Other

Mr. S. W. Kline, Bechtel Power Corporation
Ms. L. A. Matis, Tetra Tech NUS, Inc.
Dr. W. R. Jacobs, Jr., Ph.D., GDS Associates, Inc.
Mr. S. Roetger, Georgia Public Service Commission
Ms. S. W. Kernizan, Georgia Public Service Commission
Mr. K. C. Greene, Troutman Sanders
Mr. S. Blanton, Balch Bingham
NDDocumentinBox@duke-energy.com, Duke Energy
Mr. S. Franzone, Florida Power & Light

Southern Nuclear Operating Company

ND-19-0321

Enclosure 1

Vogtle Electric Generating Plant (VEGP) Units 3 and 4

Request for License Amendment:

Crediting Previously Completed ADS Blowdown First Three Plant Test

(LAR-19-XXX)

(This Enclosure consists of 16 pages, including this cover page)

Table of Contents

1. SUMMARY DESCRIPTION
2. DETAILED DESCRIPTION and TECHNICAL EVALUATION
3. TECHNICAL EVALUATION (Included in Section 2)
4. REGULATORY EVALUATION
 - 4.1 Applicable Regulatory Requirements/Criteria
 - 4.2 Precedent
 - 4.3 Significant Hazards Consideration
 - 4.4 Conclusions
5. ENVIRONMENTAL CONSIDERATIONS
6. REFERENCES

ND-19-0321

Enclosure 1

Request for License Amendment: Crediting Previously Completed First Plant and First Three Plant Tests (LAR-19-XXX)

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

1. SUMMARY DESCRIPTION

The requested amendment proposes changes to the design-specific pre-operational Automatic Depressurization System (ADS) Blowdown Test, listed in COL Condition 2.D.(2)(a)2 and described in UFSAR Subsections 14.2.5 and 14.2.9.1.3 as a first three plant only test. The proposed change would revise the COL, License Condition 2.D.(2)(a)2, by removing the requirement to perform the ADS Blowdown first three plant test during preoperational testing.

The requested amendment proposes changes to the COL Conditions and Updated Final Safety Analysis Report (UFSAR) in the form of departures from the plant-specific DCD Tier 2* and Tier 2 information (as detailed in Section 2). This enclosure requests approval of the license amendment necessary to implement these changes.

UFSAR Subsection 14.2.5 provides the basis that "[b]ecause of the standardization of the AP1000 design, these special tests (designated as first plant only tests) are not required on follow plants." UFSAR Subsection 14.2.5 also states for subsequent plants "...justification shall be provided that the results of the first plant only tests or first three plant tests are applicable to the subsequent plant." The purpose of the first three plant tests is to further establish the unique phenomenological performance parameters of the AP1000 design features. These special tests are in addition to preoperational testing that will be completed at every AP1000 unit. The ADS Blowdown preoperational first three plant test has been completed at the first AP1000 units at Sanmen Units 1 & 2 and Haiyang Unit 1.

A review of the Quality Assurance (QA) regulations governing Sanmen and Haiyang has been performed to demonstrate that the requirements governing the tests are equivalent to 10 CFR 50 Appendix B. To confirm appropriate adherence to these requirements, applicability of the ADS Blowdown first three plant test and acceptability of the results, SNC has worked with the Sanmen and Haiyang owners and Westinghouse to review the applicable administrative procedures, test procedures, test reports and results. Additionally, SNC had individuals on site at Sanmen Unit 2 observing the performance of the first three plant tests including the ADS Blowdown test. The reviews of the QA regulations, Administrative Procedures governing testing and the test procedures and reports have been documented by SNC. The observations made while on site at Sanmen Unit 2 have also been documented. These reviews have concluded that the test results from Sanmen Units 1 & 2 and Haiyang Unit 1 are acceptable.

The applicability of the tests to Vogtle Units 3 & 4 was validated by determining the systems, structures and components (SSCs) within the scope of the ADS Blowdown test are designed and procured using the same standard AP1000 design requirements across Sanmen Units 1 & 2, Haiyang Unit 1 and Vogtle Units 3 & 4. Reviews of design changes were completed to confirm Sanmen Units 1 & 2 and Haiyang Unit 1 did not have any changes that would take the SSCs involved in the testing outside of the standard plant design such that the test performance would be impacted. Vogtle Units 3 & 4 have ITAAC and pre-operational test requirements associated with the SSCs involved in the ADS Blowdown test. Completion of these ITAAC and pre-operational tests will verify that Vogtle Units 3 & 4 are within the standard plant AP1000 design as described in the Vogtle Units 3 & 4 UFSAR. The reviews completed by SNC have concluded the ADS Blowdown first three plant testing and results completed at Sanmen Units 1 & 2 and

Haiyang Unit 1 are applicable to Vogtle Units 3 & 4.

2. DETAILED DESCRIPTION and TECHNICAL EVALUATION

As described in the Combined License (COL) Condition 2.D.(2)(a), the licensee shall perform design-specific pre-operational tests including an ADS Blowdown test. The ADS Blowdown test is designated as a first three plant test. The first three plant tests are described in UFSAR Subsection 14.2.5. The tests are described as “[s]pecial tests to further establish a unique phenomenological performance parameter of the AP1000 design features beyond testing performed for Design Certification of the AP600 and that will not change from plant to plant...” UFSAR Subsection 14.2.5 also provides the basis that “[b]ecause of the standardization of the AP1000 design, these special tests (designated as first plant only tests) are not required on follow plants.”

UFSAR Subsection 14.2.5 also states for subsequent plants “...justification shall be provided that the results of the first plant only tests or first three plant tests are applicable to the subsequent plant.”

Four AP1000 units were completed ahead of the Vogtle Units 3 & 4 schedule. These are Sanmen Units 1 & 2 and Haiyang Units 1 & 2. Sanmen Units 1 & 2 and Haiyang Unit 1 have performed the pre-operational first three plant tests described in UFSAR Subsection 14.2.5 including the ADS Blowdown Test. The results of the ADS Blowdown tests have been provided to SNC for review of applicability to Vogtle Units 3 & 4. To determine if the test results are acceptable and applicable to Vogtle Units 3 & 4, various efforts have been completed to evaluate the performance of the tests and the results. The reviews performed focused on key areas including the QA regulations and administrative procedures governing the performance of the testing, evaluation of test procedures and results, and the use of standard AP1000 designed SSCs. SNC determined that the completed tests and test results met the acceptance criteria and are applicable to Vogtle Units 3 & 4.

The following sections describe assessments of the QA regulations applicable to the first three plant tests, the Westinghouse oversight of the design and testing, the SNC observation and review of the testing, and the test results and applicability to Vogtle Units 3 & 4.

2.1 Assessment of Quality Assurance Regulation

10 CFR Part 50 Appendix B requirements apply to all activities affecting the safety-related functions of those structures, systems, or components including testing. For the first three plant tests, the design of the SSCs, the testing methods and acceptance criteria, and evaluation of test results were developed by Westinghouse under a 10 CFR Part 50 Appendix B compliant program.

Performance of first three plant tests at Sanmen Units 1 & 2 and Haiyang Unit 1 were performed following the China regulatory QA requirements specified in HAF-003-1991, “Safety Regulations for Quality Assurance of Nuclear Power Plants.” A review comparing the requirements of 10 CFR Part 50 Appendix B and HAF-003-1991 was completed. This review used a matrixed table approach to compare the two regulations. The review compared the introduction and 13 sections of HAF-003-1991 to the introduction and 18 criteria of 10 CFR Part 50 Appendix B. The review concluded that the requirements of HAF-003-1991, as implemented, are comparable to and encompass the requirements of 10 CFR Part 50 Appendix B. For any specific requirements in 10 CFR Part 50 Appendix B that are not directly included in HAF-003-1991, other standards were identified that implement the same requirements of 10 CFR Part 50 Appendix B.

ND-19-0321

Enclosure 1

Request for License Amendment: Crediting Previously Completed First Plant and First Three Plant Tests (LAR-19-XXX)

Based on the review of the QA regulations, the ADS Blowdown first three plant tests performed at Sanmen Units 1 & 2 and Haiyang Unit 1 were conducted following QA standards that encompass the 10 CFR Part 50 Appendix B requirements applied at Vogtle Units 3 & 4.

2.2 Oversight and Design Control

Westinghouse is the design authority for the scope of systems and components involved in the ADS Blowdown first three plant test. Because Westinghouse is the design authority for Sanmen Units 1 & 2, Haiyang Unit 1, and Vogtle Units 3 & 4 for this scope, they play a key role in maintaining standardization of the design across the units and in oversight of testing.

Westinghouse has an NRC approved 10 CFR Part 50 Appendix B program including governance of design and document control.

10 CFR Part 50 Appendix B, Criterion III also states "Design control measures shall be applied to items such as the following: ...delineation of acceptance criteria for inspections and tests." Westinghouse engineering developed and approved the test specifications for the first plant and first three plant tests including the acceptance criteria for the tests. After initial issuance of the test specifications, changes were authorized and approved using the Westinghouse design control process. Westinghouse also worked directly with the Sanmen Units 1 & 2 and Haiyang Unit 1 owners to develop the test procedures for the ADS Blowdown first three plant test. The test procedures and test reports were authored, verified, and approved by Westinghouse test engineers and cosigned by the owners' engineers. The procedures were approved by a Test Review Board, which included Westinghouse personnel, prior to use. Major changes to the test procedures were also approved by the Test Review Board. Minor changes were reviewed and approved by Westinghouse personnel. Using this process, the acceptance criteria for the first plant and first three plant tests were developed and maintained under the Westinghouse Appendix B process.

10 CFR Part 50, Appendix B, Criterion III states "Design changes, including field changes, shall be subject to design control measures commensurate with those applied to the original design and be approved by the organization that performed the original design unless the applicant designates another responsible organization."

The AP1000 plant is a standard design across the Sanmen, Haiyang, and Vogtle units for the scope of the ADS Blowdown first three plant test. Westinghouse created, approved and maintained the design documents governing the scope of SSCs in the tests. Any design change made to an SSC involved in the ADS Blowdown first three plant test has been reviewed and approved by Westinghouse under the Westinghouse design control process. In the Westinghouse design control process, each of these design changes is designated with an applicability for any plant where the change would be applied. Changes that were only applicable to Sanmen Units 1 & 2 or Haiyang Unit 1 AP1000 units were reviewed for potential impacts to the ADS Blowdown test design parameters for that plant. The review was completed after conclusion of the testing to confirm all design changes were captured. The purpose of the review was to confirm the design of the SSCs involved in the ADS Blowdown first three plant tests at Sanmen Units 1 & 2 and Haiyang Unit 1 were not altered to be outside the standard AP1000 design such that test results could be impacted. The review of design changes concluded that there were no site-specific design changes for the Sanmen Units 1 & 2 or Haiyang Unit 1 AP1000 units which would alter any of the critical design attributes for the ADS Blowdown first three plant tests. The components involved in the testing were procured using the same design specification requirements. There is no difference between the units for these design requirements. Based on the standard AP1000

Request for License Amendment: Crediting Previously Completed First Plant and First Three Plant Tests (LAR-19-XXX)

design, review of design changes, and procurement to the same quality requirements imposed by the design specification, the Sanmen Units 1 & 2 and Haiyang Unit 1 SSCs for the ADS Blowdown first three plant tests are within the standard AP1000 design. Vogtle Units 3 & 4 follow the same design control process described above to maintain the standard plant design. Additionally, Vogtle Units 3 & 4 have ITAAC on the SSCs involved in the ADS Blowdown first three plant test. The completion of these ITAAC will confirm the SSCs for the ADS Blowdown first three plant tests meet the AP1000 standard design described in the Vogtle 3 & 4 UFSAR.

HAF-003-1991, criterion XII requires calibration and testing of test equipment, which is comparable to 10 CFR Part 50 Appendix B criterion XII requirements. Calibration requirements for measurement and test equipment (M&TE) are specified in the Sanmen Units 1 & 2 and Haiyang Unit 1 localized procedures. Westinghouse had a team of engineers on site at both Sanmen Units 1 & 2 and Haiyang Unit 1 during performance of the ADS Blowdown first three plant tests. The Westinghouse engineers were embedded in the startup organization at the sites and worked alongside the owners as the testing was performed. Prior to the testing, Westinghouse and the owners walked-down instrumentation to confirm proper installation. Calibration records for temporary instrumentation used for the engineering analysis were provided by the owners.

Post-test analysis of the test data was performed by Westinghouse to confirm the test results met the acceptance criteria. Westinghouse compared the test data with the predictive analysis models. All computer codes used for the models associated with this test used existing computer codes described in the UFSAR. No new computer codes were used for the ADS Blowdown first three plant testing. Test reports for the ADS Blowdown first three plant tests included Westinghouse engineering and safety analysis reports. The test reports were created and approved under the Westinghouse QA Program.

SNC reviewed the administrative manual procedures, test procedures, test reports, and post-test analysis. The reviews were performed by knowledgeable individuals in engineering, testing and operations. NRC Inspection Procedure 70367, "Inspection of Preoperational Test Program," was used for guidance in creating criteria to review the Sanmen and Haiyang administrative manual procedures. The purpose of the review was to assess the procedural processes and controls for the conduct of testing at Sanmen Units 1 & 2 and Haiyang Unit 1. NRC Inspection Procedure 70702, "Part 52, Inspection of Preoperational Test Performance," was used for guidance in creating criteria to review the test procedures and reports against. The conclusion of the administrative manual procedures review is that the procedures satisfy the requirements of the NRC Inspection Procedure. For instances where the NRC Inspection Procedure requirement was not explicitly addressed in a single administrative procedure, the requirement was addressed through a combination of procedures. There were no issues identified from the administrative manual procedures reviewed that would challenge any test results. The test procedures were reviewed line-by-line using the established criteria. For any inconsistencies identified in the procedures, the issue was reviewed and dispositioned for impact to the test results. Additionally, these items were reviewed by Westinghouse. The review concluded that none of these inconsistencies would impact the test results. The post-test analysis was reviewed to confirm proper documentation, the analysis methods were appropriate, and the test results meet the acceptance criteria in the Vogtle 3 & 4 UFSAR. All reviews completed by SNC have been documented following SNC procedures.

In addition to reviewing test documentation and results, SNC performed observations of pre-operational testing at Sanmen Unit 2. Two SNC individuals, with backgrounds in engineering and operations, were on site at Sanmen Unit 2 to perform observations of the pre-operational testing

including the ADS Blowdown first three plant test. The objective of the visit was to observe the following activities for those specific tests:

- performance of pre-test requirements,
- confirmation of M&TE usage,
- adherence to the approved procedure,
- execution of test changes,
- handling of anomalies, problems, and/or interruptions,
- handling of deficiencies,
- recording of data,
- maintenance of the test narrative log, and
- maintenance of operator logs.

The observations were documented in a report. The report chronicles the daily observations and access the individuals had throughout their time on site. The observations concluded the first three plant test at Sanmen Unit 2 was conducted in accordance with the test procedures.

SNC concludes that the test results are acceptable and support crediting the ADS Blowdown first three plant testing completed at Sanmen Units 1 & 2 and Haiyang Unit 1 for Vogtle Units 3 & 4.

2.3 Automatic Depressurization System Blowdown Test Results and Applicability to Vogtle Units 3 & 4

The ADS consists of four different stages of valves. The first three stages each have two lines and each line has two valves in series; both normally closed. The ADS Stage 1-3 control valves are normally closed globe valves and the isolation valves are normally closed gate valves. The first three stages have a common inlet header connected to the top of the pressurizer. The outlet of the first through third stages then combine to a common discharge line to one of the spargers in the IRWST. There is a second identical group of first through third stage valves with its own inlet and outlet lines and sparger.

Two reactor coolant depressurization spargers are provided. Each one is connected to an ADS discharge header (shared by three ADS stages) and submerged in the IRWST. Each sparger has four branch arms inclined downward. The spargers are designed to distribute steam into the IRWST and quench steam, thereby promoting more effective steam condensation.

The first three stages of ADS valves discharge through the spargers and are designed to pass sufficient depressurization venting flow, with an acceptable pressure drop, to support the depressurization system performance requirements. The installation of the spargers prevents undesirable and/or excessive dynamic loads on the IRWST and other structures. Each sparger is sized to discharge at a flow rate that supports ADS performance, which in turn allows adequate passive core cooling system injection.

In accordance with UFSAR Subsections 14.2.5 and 14.2.9.1.3, for the first three plants only, during hot functional testing of the reactor coolant system (RCS), an automatic depressurization blowdown test is performed to verify proper operation of the ADS valves and demonstrate the proper operation of the ADS spargers to limit the hydrodynamic loads in containment to less than design limits. This test is performed on only the first three plants for the following reasons:

- The operation of the ADS and the resultant hydrodynamic loads will not vary significantly from plant to plant.
- Full scale automatic depressurization testing was performed in the AP600 Design Certification Program. Testing was conducted to conservatively bound ADS flow rates and resultant hydrodynamic loads that will be experienced by the plant during ADS operation.
- Performance of this test results in a significant thermal transient on Class 1 components including the primary components. The RCS piping is designed for 3 ADS Blowdown transient cycles. Elimination of this test will result in additional conservatism in the fatigue analysis. It also results in less hydrodynamic loading in the piping and IRWST.

Predictive Analysis

The blowdown of the RCS during the ADS blowdown test was simulated using the NOTRUMP computer code used for small break loss-of-coolant accident (LOCA) analyses as described in UFSAR Subsection 15.6.5.4B.2.1.

The small-break LOCA NOTRUMP model, described in UFSAR Chapter 15, was used as the starting model for the ADS Stage 1-3 blowdown predictive analysis. The model was updated to reflect the initial RCS conditions, including nominal operating pressure and temperature.

The ADS Stage 1-3 blowdown simulation was initialized by tripping the reactor coolant pumps (RCPs). After an appropriate delay, the ADS Stage 1-3 valves were actuated. Consistent with guidance in the test procedure, the simulation began to close the ADS Stage 1-3 valves sequentially once the valves are fully open without waiting for a valve to fully close before closing the next valve. Additionally, the NOTRUMP simulation modeled the SG secondary side depressurization to maintain a differential pressure between the primary and secondary side as instructed by the test procedure.

The nominal ADS Stage 1-3 valve flow areas were based on the as-measured valve areas current at the time of the predictive analysis. To provide a range of the expected blowdown results, two runs were made with one considering maximum valve opening times and one with minimum valve opening times. The minimum valve opening time case shows faster initial RCS depressurization than the maximum valve opening time case.

The RCS significantly depressurized as a result of the ADS blowdown and is significantly voided at the end of the simulations such that the loops are either completely or highly voided and the pressurizer is filled with only steam.

UFSAR Subsection 14.2.9.1.3, Item (s), requires an ADS blowdown test to be performed to verify proper operation of the ADS valves and demonstrate the proper operation of the ADS spargers to limit the hydrodynamic loads in containment to less than design limits.

The test acceptance criteria are demonstrated by proper operation of the equipment and are not dependent on the predictive analysis. There are no specific acceptance criteria obtained from the predictive analysis. However, the predictive analysis provides the expected RCS behavior that can be compared to the actual test behavior.

The proper operation of the ADS Stage 1-3 valves is required to be demonstrated by confirming the valves opened according to the required sequence logic and timeframe. Proper operation of the ADS spargers is demonstrated by confirming that hydrodynamic loading on the IRWST walls under ADS discharge through the spargers is bounded by the +/- 5 psi uniform static design pressure limit on the IRWST walls established in UFSAR Subsection 3.8.3.4.2.2.

Test Overview

The ADS blowdown test is performed by actuating the automatic depressurization system at normal operating RCS temperature and pressure conditions.

The RCPs are initially running at 100% speed to achieve initial RCS conditions. The RCPs are then tripped, and the ADS Stage 1-3 valves are manually actuated after the speed of the RCPs reach zero. The operators control the steam generator shell side pressure to prevent the SGs from experiencing excessive reverse differential pressure. The test is terminated when the ADS Stage 1-3 valves reach full open. The valves are closed sequentially without waiting for the previous valve to fully close before closing the next valve.

The primary objective of the ADS blowdown test is to measure the dynamic pressure near multiple locations on the IRWST walls and to confirm that the ADS Stage 1-3 valves open according to the required sequence logic and time.

Additional information is recorded during the test to confirm the overall performance of the system and its components. This additional information includes:

- Temporary valve diagnostics and position indication,
- The strain on the IRWST wall,
- Effects of ADS blowdown, inside and outside the IRWST, in addition to the ADS piping, and
- A wide selection of permanent plant instrumentation data, recorded to perform a comparison with the predictive model, including but not limited to: RCS pressure, temperature and level, and IRWST temperature and level.

The proper operation of the ADS Stage 1-3 valves was confirmed using the permanent position indication available in the Main Control Room (MCR). Additional temporary valve diagnostics and position indication was used to support the conclusions. The ADS Stage 1-3 valves were confirmed to open according to the required sequence logic and time. The position indication available in the MCR and the additional temporary valve diagnostics and position indication also confirmed the proper operation of the ADS Stage 1-3 valves.

To verify the test results meet UFSAR Subsection 14.2.9.1.3 Item (s) acceptance criteria to demonstrate the proper operation of the ADS spargers to limit the hydrodynamic loads in containment to less than design limits, post-test analysis of the test data was completed. The design limits for the IRWST during ADS Blowdown are defined in UFSAR Subsection 3.8.3.4.2.2. Multiple analyses were completed as part of the post-test analysis. The post-test analyses demonstrated that the as-tested IRWST average distributed wall pressures are within the limits identified in the existing UFSAR Subsection 3.8.3.4.2.2 analyses. The analyses

evaluated the range of dominant frequencies in the ADS Blowdown tests and found those to be encompassed by the range of dominant frequencies considered in the ADS actuation hydrodynamic analysis used to support the IRWST design limit in UFSAR Subsection 3.8.3.4.2.2. Therefore, the +/- 5 psi design limit established in the UFSAR Subsection 3.8.3.4.2.2 remains bounding.

The testing demonstrated that in each of the first three plants, the as-built RCS behaved very similarly to the results of the predictive analysis model. No test deviations impacting the acceptance criteria were observed in the three credited tests. The Westinghouse review and evaluation of the test results to verify acceptability is documented in post-test reports and analyses. SNC reviewed the post-test analysis and based on the results of the frequency analysis concluded the test results are acceptable and the test results met the UFSAR Subsection 14.2.9.1.3 acceptance criteria for the ADS Blowdown first three plant test.

Applicability of Test to Vogtle Units 3 & 4

Vogtle UFSAR Subsection 14.2.5 states that "...justification shall be provided that the results of the first plant only test or first three plant test are applicable to the subsequent plant." UFSAR Subsection 14.2.5 also provides the basis that "because of the standardization of the AP1000 design, once these special tests have affirmed consistent passive system function they are not required on follow plants." Therefore, verifying standardization of the component design between Sanmen Units 1&2, Haiyang 1 and Vogtle Units 3 & 4 provides the basis that the successful test results are applicable to Vogtle Units 3 & 4.

The critical design and construction attributes for the overall ADS blowdown are:

- ADS Stage 1, 2, and 3 valve effective flow area (choked flow);
- Sparger design;
- Valve opening time and area; and
- Design of IRWST walls, floors and total volume.

The major components, piping, and IRWST at Sanmen Units 1 & 2, Haiyang Unit 1, and Vogtle Units 3 & 4 are of the same design and are manufactured to the same design specifications. Major deviations in behavior and differences in phenomenology were not observed in any of these first three plants. The results did not vary significantly from plant to plant and the reproducibility of the results between these first three units demonstrates that the ADS blowdown and RCS depressurization performance does not vary significantly from plant to plant. This reproducibility of plant performance is the result of the AP1000 standardization. Any design changes made to any of these standard components are captured in the Westinghouse design change process. A review has confirmed that there are no site-specific design changes for either Sanmen Units 1&2, Haiyang Unit 1, or Vogtle Units 3 & 4 that alter the standard design features for any of the components involved in this test. There are no open corrective actions against any test documentation or results from Sanmen Units 1 & 2 and Haiyang Unit 1.

In addition to using standard design and procurement requirements, Vogtle Units 3 & 4 has multiple ITAAC which are applicable to the components involved in this test. These ITAAC will further demonstrate design standardization. The following ITAAC will confirm the critical design

and construction attributes related to this test:

- ITAAC No. 2.2.03.08c.iii, IRWST volume
- ITAAC No. 2.1.02.08d.i, Preoperational Test for Resistance of the ADS Stage 1, 2, 3 flow path(s)
- ITAAC No. 2.1.02.08d.iv, Vendor report on ADS 1, 2, 3 valve effective flow area
- ITAAC No. 2.1.02.08d.vii, Vendor report on Sparger flow area
- ITAAC No. 2.1.02.08d.viii, Inspection of Sparger location

Vogtle Units 3 & 4 will perform the passive core cooling system (PXS) pre-operational tests described in UFSAR Subsection 14.2.9.1.3 which will verify the installed components and associated piping and valves properly perform their design function. Based on the use of standard designed components, ITAAC for critical design features and pre-operational tests, the boundary conditions for the ADS blowdown test are the same for Sanmen Unit 1&2, Haiyang Unit 1, and Vogtle Units 3 & 4.

Therefore, the successful completion and results of the first three plant ADS Blowdown tests at Sanmen Units 1&2 and Haiyang 1 are applicable to Vogtle Units 3 & 4, and the ADS Blowdown test is not required to be performed at Vogtle Units 3 & 4.

2.4 Changes to Current Licensing Basis Documents

COL Condition Changes

Combined License Condition 2.D.(2)(a), Pre-operational Testing, is revised to remove the requirement to perform the design-specific pre-operational ADS Blowdown first three plant test. The change credits previously completed tests which confirmed the design functions of the involved SSCs.

UFSAR Tier 2 Changes

1. UFSAR Subsection 14.2.5 is revised to state the ADS Blowdown test will not be run at Vogtle Units 3 & 4 based on the successful completion of the tests at the first AP1000 units.
2. UFSAR Subsection 14.2.9.1.3 is revised to remove the test descriptions for the ADS Blowdown first three plant tests. A statement is added that the test will not be run at Vogtle Units 3 & 4 based on the successful completion of the test at the first AP1000 units.

2.5 Summary

The proposed changes credit previously completed ADS Blowdown first three plant tests which confirmed the design functions of the involved SSCs. There are no changes to any pre-operational testing requirements from Regulatory Guide 1.68. The proposed changes do not affect any function or feature used for the prevention and mitigation of accidents or their safety analyses. No changes were made to the assumptions used in the Chapter 15 analyses. No safety-related structure, system, or component (SSC) function is changed. The proposed changes do not involve

nor interface with any SSC accident initiator or initiating sequence of events related to the accidents evaluated in the plant-specific Design Control Document (DCD) or UFSAR. The proposed changes do not affect the radiological source terms (i.e., amounts and types of radioactive materials released, their release rates and release durations) used in the accident analyses. No system or design function or equipment qualification is adversely affected by the proposed changes. The changes do not result in a new failure mode, malfunction or sequence of events that could adversely affect a radioactive material barrier or safety-related equipment. The proposed changes do not allow for a new fission product release path, result in a new fission product barrier failure mode, or create a new sequence of events that would result in significant fuel cladding failures. The proposed changes do not adversely affect any design code limit allowable value, design analysis, nor do they adversely affect any safety analysis input or result, or design/safety margin. The proposed changes do not revise any aspects of the plant that could have any adverse effect on safety or security, including the site emergency plan.

3. TECHNICAL EVALUATION (Included in Section 2)

4. REGULATORY EVALUATION

4.1 Applicable Regulatory Requirements/Criteria

10 CFR Part 52.98(c) requires an amendment to the license for any modification to, addition to, or deletion from the terms and conditions of a combined license, including modification to, addition to, or deletion from the inspections, tests, analyses, or related acceptance criteria contained in the license. This change involves changes to UFSAR Subsections 14.2.5 and 14.2.9 which requires a revision to the COL 2.D.(2)(a). Therefore, a license amendment request (LAR) (as supplied herein) is required.

10 CFR Part 52, Appendix D, Section VIII.B.5.a allows an applicant or licensee who references this appendix to depart from Tier 2 information, without prior NRC approval, unless the proposed departure involves a change to or departure from Tier 1 information, Tier 2* information, or the Technical Specifications, or requires a license amendment under paragraphs B.5.b or B.5.c of the section. The proposed changes to the ADS Blowdown first three plant tests include changes to Tier 2* information in UFSAR Subsections 14.2.5 and 14.2.9.1.3. Therefore, NRC approval is required for the departures.

10 CFR Part 50, Appendix A, General Design Criterion (GDC) 1, requires that structures, systems, and components (SSCs) important to safety be designed, fabricated, erected, and tested to quality standards commensurate with the importance of the safety functions to be performed. The proposed changes involve crediting results for ADS Blowdown first three plant tests which were previously completed at the lead AP1000 units and do not need to be repeated at Vogtle Units 3 & 4. The test results confirmed the design functions of the involved SSCs. The proposed changes do not alter any design, analysis or test acceptance criteria. Therefore, the proposed changes comply with the requirements of GDC 1.

10 CFR Part 50, Appendix A, GDC 35 requires that a system to provide abundant emergency core cooling be provided. The system safety function shall be to transfer heat from the reactor core following any loss of reactor coolant at a rate such that (1) fuel and clad damage that could interfere with continued effective core cooling is prevented and (2) clad metal-water reaction is limited to negligible amounts. The proposed changes to credit previously completed ADS Blowdown first three plant tests involving PXS do not include changes to any design feature or function described in the UFSAR. The changes credit previously completed tests which confirmed

the design functions of the involved SSCs. Therefore, the proposed changes comply with the requirements of GDC 35.

10 CFR Part 50, Appendix A, GDC 36 requires that the emergency core cooling system be designed to permit appropriate periodic inspection of important components, such as spray rings in the reactor pressure vessel, water injection nozzles, and piping, to assure the integrity and capability of the system. The proposed changes to credit previously completed ADS Blowdown first three plant tests involving PXS do not include physical changes to any component. The changes credit previously completed tests which confirmed the design functions of the involved SSCs. Therefore, the proposed changes do not adversely affect the capability to perform appropriate inspections and comply with the requirements of GDC 36.

10 CFR Part 50, Appendix A, GDC 37 requires that the emergency core cooling system be designed to permit appropriate periodic pressure and functional testing to assure (1) the structural and leak tight integrity of its components, (2) the operability and performance of the active components of the system, and (3) the operability of the system as a whole and, under conditions as close to design as practical, the performance of the full operational sequence that brings the system into operation, including operation of applicable portions of the protection system, the transfer between normal and emergency power sources, and the operation of the associated cooling water system. The proposed changes to credit previously completed ADS Blowdown first three plant tests involving PXS do not include changes to any design feature or function described in the UFSAR. The changes credit previously completed tests which confirmed the design functions of the involved SSCs. Therefore, the proposed changes comply with the requirements of GDC 37.

Regulatory Guide 1.68 describes the Initial Test Program (ITP) requirements. The proposed changes to credit the previously completed ADS Blowdown first three plant tests do not alter compliance with RG 1.68 and the SSCs within the scope of RG 1.68 are still included in the ITP. The proposed changes to credit previously completed ADS Blowdown first three plant testing do not adversely impact the UFSAR in terms of conformance to RG 1.68.

The proposed changes have been evaluated to determine whether applicable regulations continue to be met. It was determined that the proposed changes do not affect conformance with the General Design Criteria differently than described in the plant-specific DCD or UFSAR.

4.2 Precedent

There is precedence to remove COL License Conditions requiring the performance of first plant only and first three plant testing. The request to utilize and evaluate the results of tests performed on the first AP1000 plant as part of the initial test program for VEGP Units 3 & 4 was approved by the NRC by issuance of Amendment Numbers 151 and 150 to COL Numbers NPF-91 and NPF-92 for the VEGP Units 3 & 4, respectively (see Reference Section).

4.3 Significant Hazards Consideration

The requested amendment involves changes to credit previously completed ADS Blowdown first three plant preoperational testing in the VEGP Units 3 & 4 COLs and UFSAR Subsections 14.2.5 and 14.2.9 based on the successful completion of the tests at the lead AP1000 units.

The requested amendment proposes a change to COL Condition 2.D.(2)(a) and associated UFSAR information supporting this change.

ND-19-0321

Enclosure 1

Request for License Amendment: Crediting Previously Completed First Plant and First Three Plant Tests (LAR-19-XXX)

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

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

Response: No

The proposed change does not affect the operation of any systems or equipment that initiates an analyzed accident or alter any structures, systems, or components (SSC) accident initiator or initiating sequence of events. The proposed changes remove the requirement to perform the ADS Blowdown first three plant test based on the successful completion of the tests at the lead AP1000 units. The change does not adversely affect any methodology which would increase the probability or consequences of a previously evaluated accident.

The change does not impact the support, design, or operation of mechanical or fluid systems. There is no change to plant systems or the response of systems to postulated accident conditions. There is no change to predicted radioactive releases due to normal operation or postulated accident conditions. The plant response to previously evaluated accidents or external events is not adversely affected, nor does the proposed change create any new accident precursors.

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

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

Response: No

The proposed change does not affect the operation of any systems or equipment that may initiate a new or different kind of accident, or alter any SSC such that a new accident initiator or initiating sequence of events is created.

The proposed change credits previously completed ADS Blowdown first three plant testing based on the successful completion of the tests at the lead AP1000 units. The proposed changes do not adversely affect any design function of any SSC design functions or methods of operation in a manner that results in a new failure mode, malfunction, or sequence of events that affect safety-related or non-safety-related equipment. This activity does not allow for a new fission product release path, result in a new fission product barrier failure mode, or create a new sequence of events that result in significant fuel cladding failures.

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

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

Response: No

The proposed change maintains existing safety margin and provides adequate protection through continued application of the existing requirement in the UFSAR. The proposed change satisfies the same design functions in accordance with the same codes and standards as stated in the UFSAR. This change does not adversely affect any design code, function, design analysis, safety analysis input or result, or design/safety margin. No safety analysis or design basis acceptance limit/criterion is challenged or exceeded by the proposed change.

Since no safety analysis or design basis acceptance limit/criterion is challenged or exceeded by this change, no significant margin of safety is reduced.

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

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

4.4 Conclusions

This assessment addresses the considerations discussed above. The plant licensing basis, safety analyses, and design bases evaluations demonstrate that the requested change is accommodated without an increase in the probability or consequences of an accident previously evaluated, without creating the possibility of a new or different kind of accident from any accident previously evaluated, and without a significant reduction in the margin of safety. In conclusion, based on the considerations discussed above, (1) there is a reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner, (2) such activities will be conducted in compliance with the Commission's regulations, and (3) the issuance of the amendment will not be inimical to the common defense and security or to the health and safety of the public. Having arrived at negative declarations with regard to the criteria of 10 CFR 50.92, this assessment determined that the requested change does not involve a Significant Hazards Consideration.

5. ENVIRONMENTAL CONSIDERATIONS

This review supports a request to amend the Combined License (COL) to revise the element of the certification information related to pre-operational ADS Blowdown first three plant test requirements in Updated Final Safety Analysis Report (UFSAR) and COL Condition 2.D.(2)(a).

Sections 2 and 3 of this license amendment request provide the details of the proposed change.

The Licensee has determined that the anticipated construction and operational effects of the proposed amendment meet the eligibility criteria for categorical exclusion set forth in 10 CFR 51.22(c)(9), in that:

(i) *There is no significant hazards consideration.*

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

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

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

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

The proposed changes do not adversely affect walls, floors, or other structures that provide shielding. Plant radiation zones are not affected, and there are no changes to the controls required under 10 CFR Part 20 that preclude a significant increase in occupational radiation exposure. Therefore, the requested amendment does not involve a significant increase in individual or cumulative occupational radiation exposure.

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

6. REFERENCES

NRC Letter, "Vogtle Electric Generating Plant, Units 3 and 4 – Issuance of Amendments and Granting of Exemptions RE: Crediting Previously Completed First Plant and First Three Plant Tests (LAR-18-019)", dated January 22, 2019 (ADAMS Accession No. ML18351A342)

Southern Nuclear Operating Company

ND-19-0321

Enclosure 2

Vogtle Electric Generating Plant (VEGP) Units 3 and 4

Proposed Changes to the Licensing Basis Documents

(LAR-19-XXX)

Note:

Added text is shown as Blue Underline

Deleted text is shown as ~~Red Strikethrough~~

Omitted text is shown as three asterisks (*...*...*)

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

COL Changes

Combined License Condition 2.D.(2)(a), Pre-operational Testing – Revise information related to design-specific Automatic Depressurization System Blowdown first three plant test as shown below.

(2) Pre-operational Testing

(a) SNC shall perform the design-specific pre-operational tests identified below:

1. Pressurizer Surge Line Stratification Evaluation (first plant test as identified in UFSAR, Section 14.2.9.1.7 Item (d));
2. ~~Automatic Depressurization System Blowdown Test (first three plants test as identified in UFSAR Section 14.2.9.1.3 Item (s)).~~

UFSAR Changes

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

* * *

ADS Blowdown Test (14.2.9.1.3, Item (s))

[This first three plant only test was completed at the first three AP1000 units. This test is not required to be conducted at Vogtle Units 3 & 4.](#)

During preoperational testing of the passive core cooling system, the resistance of the automatic depressurization system Stage 1, 2, 3 flow path(s) is verified. For the first three plants only, an automatic depressurization blowdown test is performed to verify proper operation of the ADS valves, and demonstrate the proper operation of the ADS spargers to limit the hydrodynamic loads in containment to less than design limits. This test is performed on only the first three plants for the following reasons:

- The operation of the ADS, and the resultant hydrodynamic loads will not vary significantly from plant to plant.
- Full scale automatic depressurization testing was performed in the AP600 Design Certification Program. Testing was conducted to conservatively bound ADS flow rates and resultant hydrodynamic loads that will be experienced by the plant during ADS operation.
- Performance of this test results in significant thermal transients on Class 1 components including the primary components. It also results in hydrodynamic loads in containment including the IRWST.

* * *

UFSAR Subsection 14.2.9.1.3, delete general test method and acceptance criteria for items s as shown below.

* * *

s) This first three plant only test was completed at the first three AP1000 units. This test is not required to be conducted at Vogtle Units 3 & 4. ~~*During hot functional testing of the reactor coolant system, proper operation of automatic depressurization is verified by blowing down the reactor coolant system. This testing verifies proper operation of the stage 1, 2, and 3 components including the ability of the spargers to limit loads imposed on the in-containment refueling water storage tank by the blowdown. Proper operation of the stage 1, 2 and 3 valves is demonstrated during blowdown conditions. Note that this verification is required only for the first three plants.*~~*

* * *