Charles R. Pierce
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SOUTHERN COMPANY

February 13, 2015

Docket Nos.: 50-348 50-424
50-364 50-425

NL-15-0188

U. S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, D. C. 20555-0001

Joseph M. Farley Nuclear Plant – Units 1 and 2
Vogtle Electric Generating Plant – Units 1 and 2
Response to Request for Additional Information Regarding the License Amendment Request to Revise Technical Specification Surveillance Requirement 3.1.3.2 and Specification 5.6.5

Ladies and Gentlemen:

By letter dated September 17, 2014, Southern Nuclear Operating Company (SNC), submitted a request to revise the Joseph M. Farley Nuclear Plant (FNP), Unit 1 and Unit 2, and the Vogtle Electric Generating Plant (VEGP), Unit 1 and Unit 2, Technical Specification Surveillance Requirement 3.1.3.2 and TS 5.6.5. These revisions are related to the near end of life (EOL) moderator temperature coefficient (MTC) measurement.

By letter dated December 16, 2014, the Nuclear Regulatory Commission (NRC) submitted a Request for Additional Information (RAI) letter to SNC. Enclosures 2 and 3 provide the proprietary and non-proprietary versions of the SNC response, respectively. Enclosure 1 provides the Westinghouse affidavit requesting to withhold Enclosure 2 from public disclosure. Enclosures 4 and 5 provide the revised "marked" and "clean" TS 5.6.5, respectively, for FNP, and Enclosures 6 and 7 provide the revised "marked" and "clean" TS 5.6.5, respectively, for VEGP. These TS 5.6.5 pages replace those sent in the September 17, 2014 SNC letter. The rest of the "marked" and "clean" pages in the September 17, 2014 letter remain unchanged.

This letter contains no NRC commitments. If you have any questions, please contact Ken McElroy at (205) 992-7369.

Mr. C. R. Pierce states he is Regulatory Affairs Director of Southern Nuclear Operating Company, is authorized to execute this oath on behalf of Southern Nuclear Operating Company and to the best of his knowledge and belief, the facts set forth in this letter are true.

Respectfully submitted,

C R Pierce

C. R. Pierce
Regulatory Affairs Director

Sworn to and subscribed before me this 13th *day of* February*, 2015.*

Notary Public

My commission expires: 1/2/2018

Enclosures:
1. Westinghouse Affidavit Requesting Withholding of Enclosure 2
2. SNC Response to NRC RAIs (Proprietary)
3. SNC Response to NRC RAIs (Non-Proprietary)
4. Revised FNP TS 5.6.5 (Marked)
5. Revised FNP TS 5.6.5 (Clean)
6. Revised VEGP TS 5.6.5 (Marked)
7. Revised VEGP TS 5.6.5 (Clean)

cc: <u>Southern Nuclear Operating Company</u>
Mr. S. E. Kuczynski, Chairman, President & CEO
Mr. D. G. Bost, Executive Vice President & Chief Nuclear Officer
Ms. C. A. Gayheart, Vice President - Farley
Mr. D. R. Madison, Vice President – Fleet Operations
Mr. B. K. Taber, Vice President – Vogtle 1 & 2
Mr. M. D. Meier, Vice President – Regulatory Affairs
Mr. B. J. Adams, Vice President – Engineering
Mr. R. R. Martin, Regulatory Affairs Manager – Farley
Mr. G. W. Gunn, Regulatory Affairs Manager – Vogtle 1 & 2
RType: CFA04.054; CVC7000

<u>U. S. Nuclear Regulatory Commission</u>
Mr. V. M. McCree, Regional Administrator
Mr. S. A. Williams, NRR Project Manager – Farley
Mr. L. M. Cain, Senior Resident Inspector – Vogtle 1 & 2
Mr. P. K. Niebaum, Senior Resident Inspector - Farley
Mr. R.E. Martin, NRR Project Manager – Vogtle 1 & 2

Joseph M. Farley Nuclear Plant – Units 1 and 2
Vogtle Electric Generating Plant – Units 1 and 2
Response to Request for Additional Information Regarding the License Amendment Request to Revise Technical Specification Surveillance Requirement 3.1.3.2 and Specification 5.6.5

Enclosure 1

Westinghouse Affidavit Requesting Withholding of Enclosure 2

Westinghouse

Westinghouse Electric Company
Engineering, Equipment and Major Projects
1000 Westinghouse Drive, Building 3
Cranberry Township, Pennsylvania 16066
USA

U.S. Nuclear Regulatory Commission
Document Control Desk
11555 Rockville Pike
Rockville, MD 20852

Direct tel: (412) 374-4643
Direct fax: (724) 940-8560
e-mail: greshaja@westinghouse.com
Proj letter: GP-19294

CAW-15-4098

February 12, 2015

APPLICATION FOR WITHHOLDING PROPRIETARY
INFORMATION FROM PUBLIC DISCLOSURE

Subject: Response to Request for Additional Information Regarding the License Amendment Request to Revise Technical Specification Surveillance Requirement 3.1.3.2 and Specification 5.6.5 (Proprietary)

The proprietary information for which withholding is being requested in the above-referenced report is further identified in Affidavit CAW-15-4098 signed by the owner of the proprietary information, Westinghouse Electric Company LLC. 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 Operating Company (SNC).

Correspondence with respect to the proprietary aspects of the Application for Withholding or the Westinghouse Affidavit should reference CAW-15-4098, and should be addressed to James A. Gresham, Manager, Regulatory Compliance, Westinghouse Electric Company, 1000 Westinghouse Drive, Building 3 Suite 310, Cranberry Township, Pennsylvania 16066.

Very truly yours,

JA Gresham

James A. Gresham, Manager
Regulatory Compliance

CAW-15-4098

February 12, 2015

AFFIDAVIT

COMMONWEALTH OF PENNSYLVANIA:

ss

COUNTY OF BUTLER:

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

James A. Gresham, Manager

Regulatory Compliance

(1) I am Manager, Regulatory Compliance, 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 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, it 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 "Response to Request for Additional Information Regarding the License Amendment Request to Revise Technical Specification Surveillance Requirement 3.1.3.2 and Specification 5.6.5" (Proprietary), for submittal to the Commission, being transmitted by Southern Nuclear Operating Company (SNC) letter and Application for Withholding Proprietary Information from Public Disclosure, to the Document Control Desk. The proprietary information as submitted by Westinghouse is that associated with SNC's request for NRC approval of a License Amendment Request that would allow a change to the Technical Specifications to provide a conditional exemption from Moderator Temperature Coefficient measurement, and may be used only for that purpose.

(a) This information is part of that which will enable Westinghouse to:

(i) Assist SNC with obtaining NRC approval of a License Amendment Request that would allow a change to the Technical Specifications to provide a conditional exemption from Moderator Temperature Coefficient measurement.

(ii) Provide results of customer specific calculations.

(iii) Provide licensing support for customer submittals.

(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 meeting NRC requirements for licensing documentation associated with End of Life Moderator Temperature Coefficient Elimination submittals.

(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.

PROPRIETARY INFORMATION NOTICE

Transmitted herewith are proprietary and/or non-proprietary versions of documents furnished to the NRC associated with SNC's request for NRC approval of a License Amendment Request that would allow a change to the Technical Specifications to provide a conditional exemption from Moderator Temperature Coefficient measurement, and may be used only for that purpose.

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.

Southern Nuclear Operating Company (SNC)

Letter for Transmittal to the NRC

The following paragraphs should be included in your letter to the NRC Document Control Desk:

Enclosed are:

1. One copy of "Response to Request for Additional Information Regarding the License Amendment Request to Revise Technical Specification Surveillance Requirement 3.1.3.2 and Specification 5.6.5" (Proprietary)

2. One copy of "Response to Request for Additional Information Regarding the License Amendment Request to Revise Technical Specification Surveillance Requirement 3.1.3.2 and Specification 5.6.5" (Non-Proprietary)

Also enclosed is the Westinghouse Application for Withholding Proprietary Information from Public Disclosure CAW-15-4098, accompanying Affidavit, Proprietary Information Notice, and Copyright Notice.

As Item 1 contains information proprietary to Westinghouse Electric Company LLC, it is supported by an Affidavit signed by Westinghouse, the owner of the information. The Affidavit 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 Section 2.390 of the Commission's regulations.

Accordingly, it is respectfully requested that the information which is proprietary to Westinghouse be withheld from public disclosure in accordance with 10 CFR Section 2.390 of the Commission's regulations.

Correspondence with respect to the copyright or proprietary aspects of the items listed above or the supporting Westinghouse Affidavit should reference CAW-15-4098 and should be addressed to James A. Gresham, Manager, Regulatory Compliance, Westinghouse Electric Company, 1000 Westinghouse Drive, Building 3 Suite 310, Cranberry Township, Pennsylvania 16066.

Joseph M. Farley Nuclear Plant – Units 1 and 2
Vogtle Electric Generating Plant – Units 1 and 2
Response to Request for Additional Information Regarding the License Amendment Request to Revise Technical Specification Surveillance Requirement 3.1.3.2 and Specification 5.6.5

Enclosure 3

SNC Response to NRC RAIs (Non-Proprietary)

CE-15-96
Attachment 2

Response to Request for Additional Information Regarding the License Amendment Request to Revise Technical Specification Surveillance Requirement 3.1.3.2 and Specification 5.6.5

(Non-Proprietary)

Response to Request for Additional Information Regarding the License Amendment Request to Revise Technical Specification Surveillance Requirement 3.1.3.2 and Specification 5.6.5

RAI #1

"On December 28, 2012, the NRC issued requests for additional information (RAIs) for a similar license amendment request (LAR) at Beaver Valley Power Station (BVPS). In Enclosure 9, SNC provided their responses to these RAIs. Table 1 of Enclosure 9 provides a summary of statistics to compare PHOENIX-P/ANC and NEXUS/ANC results. Though the PHOENIX-P/ANC and NEXUS/ANC results compare favorably to each other, they appear to differ significantly from the values found in Table 3-1 of WCAP-13749-P-A. Please discuss this discrepancy.

"In this discussion, emphasis should be placed on the differences in the means and standard deviations between the two tables, particularly for the end-of-cycle (EOC) hot full power (HFP) moderator temperature coefficient (MTC). The discussion should present a statistical analysis of the datasets used to generate the two tables to explain whether or not the results presented belong to the same population.

"The discussion should also address the deviation between measured and predicted critical boron throughout the cycle. Based on the statistics provided, many of the calculated values would apparently violate the generally-used acceptance criterion of ± 50 ppm for comparison to measurements (as discussed in ANSI/ ANS-19.6.1, the PARAGON topical report WCAP-16045-P-A, and others)."

RESPONSE to RAI #1

<u>Response to RAI #1, Paragraphs 1 and 2</u>

The plants and cycles used for benchmarking Westinghouse PWR nuclear analysis methods are continuously updated to reflect the changes that occur in fuel management and operations. Westinghouse does not use one single consistent set of plant/cycles for code qualification, because that would restrict the validation basis to include only old operating cycles that do not reflect today's modern fuel designs, power uprates, increased fuel burnups, and longer cycles with higher operating capacity factors.

Table 3-1 in WCAP-13749-P-A compares the measured to predicted EOL HFP MTC. The Table 3-1 results show a mean difference of [ ]^{a,c} pcm/°F and a standard deviation of [ ]^{a,c} pcm/°F based on [ ]^{a,c} data points. Based on RAIs received for the EOL MTC topical report, additional data was also provided in Section G, Table 2 of that topical report. The EOC HFP MTC data is expanded to include [ ]^{a,c} data points with a mean difference of [ ]^{a,c} pcm/°F and a standard deviation of [ ]^{a,c} pcm/°F.

Enclosure 9 of NL-14-0115 compared recent NEXUS/ANC code system predictions to recent PHOENIX-P/ANC code system predictions to establish the similarity of predictions for MTC and ITC between the two code systems. The data presented was from the qualification of the

NEXUS/ANC code system, so it used the more recent plant/cycle data used in that code system qualification. However, EOL HFP MTC comparisons of measured and predicted data were not available for this qualification effort, so only comparisons of predictions for EOL HFP MTC between the NEXUS/ANC and PHOENIX-P/ANC code systems were presented. These comparisons demonstrate the predictive capability for the NEXUS/ANC code system is comparable to the predictive capability for the PHOENIX-P/ANC code system.

Table 1 of enclosure 9 (pg. E9-5) provides the ITC and MTC comparisons. Using the more recent plant/cycle data, the BOC, HZP ITC predictions from [ ]^{a,c} data points using the PHOENIX-P/ANC code system show a mean difference of [ ]^{a,c} pcm/°F and a standard deviation of [ ]^{a,c} pcm/°F. This code performance is comparable to the data presented in the EOL MTC topical report. The comparable NEXUS/ANC code system data shows a mean difference of [ ]^{a,c} pcm/°F and a standard deviation of [ ]^{a,c} pcm/°F. The NEXUS/ANC code system appears to be slightly more accurate for BOC, HZP ITC predictions compared to the PHOENIX-P/ANC code system, although the differences are relatively small. Absolute comparisons of predicted EOL, HFP MTC are also presented in that table for both code systems to again demonstrate the similarity of the predictions. These are not measured minus predicted comparisons, but just comparisons of absolute MTC predicted values. For the PHOENIX-P/ANC code system, the mean prediction is [ ]^{a,c} pcm/°F with a standard deviation of [ ]^{a,c} pcm/°F. For the NEXUS/ANC code system the mean prediction is [ ]^{a,c} pcm/°F with a standard deviation of [ ]^{a,c} pcm/°F. This comparison again demonstrates that the code systems provide comparable predictive capability, so the conclusions of the EOL MTC topical report, WCAP-13749-P-A would not change based on substitution of the NEXUS code system for the PHOENIX-P/ANC code system.

Some comparisons of PHOENIX-P/ANC code system predictions of EOL HFP MTC to measurements are also provided to illustrate that data comparisons using more recent plant/cycles show behavior that is as good as or better than that presented in the EOL MTC measurement elimination topical report, WCAP-13749-P-A. The more recent PHOENIX-P/ANC code system EOL, HFP MTC measured to predicted comparisons show a mean difference of [ ]^{a,c} pcm/°F and a standard deviation of [ ]^{a,c} pcm/°F. These comparisons show somewhat better performance compared to the EOL MTC measurement elimination topical report, WCAP-13749-P-A, but are also taken from a smaller set of plant cycles, where [ ]^{a,c} plant cycles are presented. Based on the close agreement between PHOENIX-P/ANC and NEXUS/ANC, as described above, comparable measured to predicted statistics for the EOL HFP MTC are expected when the predictions are based on NEXUS/ANC.

Response to RAI #1, Paragraph 3

Regarding the question on deviation between measured and predicted critical boron concentrations throughout the cycle, the measured data includes the effects of boron-10 (^{10}B) depletion in the coolant during the cycle, while the predictions assume the nominal (no ^{10}B depletion) ^{10}B fractions. During operation, the ^{10}B in the coolant will deplete due to exposure to neutron flux from the reactor core. As a result, the measured concentration at the middle of the cycle will be higher to maintain critical conditions than if no ^{10}B depletion occurred.

Westinghouse chose to present the comparison data without accounting for depletion effects in the predictions, since we do not have access to the actual measured ^{10}B fractions for all of the cycles where we compare it to measured data. The effect of ^{10}B depletion is largest at the middle of cycle, where the measured concentrations are typically 50-100 ppm higher than if no ^{10}B depletion were occurring. Based on Westinghouse's experience with modeling ^{10}B depletion when the data is available, accounting for this effect would significantly reduce the mean error in the presented MOC data such that it would compare with or be better than previously reported performance statistics.

To illustrate this point, two plant cycles were simulated to predict the effects of ^{10}B depletion in the coolant. One is a three loop plant and the other is a four loop plant. The three loop plant shows that accounting for ^{10}B depletion increased the MOC boron concentration by [ ]^{a,c} ppm, while the four loop result is a [ ]^{a,c} ppm increase in predicted boron. These results are consistent with the reported MOC difference in boron concentration where ^{10}B depletion effects were not included in the predictions.

a,c

Predicted Boron-10 Depletion Effects - Plant A Cycle 26

a,c

Predicted Boron-10 Depletion Effects - Plant B Cycle 19

RAI #1 Response Conclusion

In conclusion, the plants/cycles chosen for code validation are always being updated as new data from more recent, modern core and fuel design become available. A comparison of the code performance for MTC predictions shows a general improvement over time. The NEXUS/ANC code system also shows slightly better performance compared to the older PHOENIX-P/ANC code system. As such, the conclusions of the EOL MTC measurement elimination topical report, WCAP-13749-P-A remain applicable when either code system is used.

RAI #2

"The LAR states that the 'FNP [Farley Nuclear Plant] and VEGP [Vogtle Electric Generating Plant] core design calculations are currently being transitioned from nuclear calculations that are performed with the PHOENIX-P lattice code to generate cross-section data to those that will be performed with the PARAGON lattice code.' Farley TS 5.6.5.b, the Core Operating Limits Report (COLR) reference list, includes references for PHOENIX-P as well as the PARAGON and NEXUS methodologies. Vogtle TS 5.6.5.b, on the other hand, does not include any of these references.

"In both sites' TS, WCAP-9272-P-A, 'Westinghouse Reload Safety Evaluation Methodology' is referenced for calculation of the moderator temperature coefficient. WCAP-9272 states that 'the values of all measured parameters are calculated using the design codes described in Table 3.1.' Table 3.1 is a list of older neutronics codes, such as LEOPARD and TURTLE, which were in use at the time when WCAP-9272-P-A was first published in 1978. While the Vogtle and Farley Final Safety Analysis Reports (FSARs) include references to these older codes as well as newer codes like PHOENIX-P and ANC, they both indicate that the newer codes are used for core design.

a. Please discuss how WCAP-9272-P-A is being used for calculation of the MTC limits for TS 3.1.3 when the codes being used for design are not part of the WCAP-9272-P-A methodology.

b. Please provide a justification for why the COLR reference list for Vogtle does not need to be updated to include PHOENIX-P, PARAGON, and/or NEXUS. This is especially pertinent given that Farley submitted an LAR on August 14, 2012 (ADAMS Accession No. ML 12227A884), specifically to include NEXUS in their COLR reference list."

RESPONSE TO RAI #2.a

WCAP-9272-P-A is currently being used at Farley and Vogtle Units 1 and 2 for the calculation of the Moderator Temperature Coefficient (MTC) limits, as is currently identified in TS 5.6.5.b for each of those plants. As noted in the RAI, the computer codes cited in WCAP-9272-P-A, LEOPARD and TURTLE have been superseded by newer codes, specifically PHOENIX-P and ANC, as correctly described in the Farley and Vogtle FSARs. ANC was approved by the NRC via WCAP-10965-P-A, which states: "The intended usage of the Advanced Nodal Code encompasses all applications described in the reload safety evaluation methodology topical report. [3]", where [3] refers to WCAP-9272-P-A. The NRC then approved the use of PHOENIX-P and ANC based on qualification work that was documented in WCAP-11596-P-A, which incorporates WCAP-10965-P-A by reference. This reference (WCAP-11596-P-A) thus supports the use of PHOENIX-P and ANC in lieu of LEOPARD and TURTLE for Farley and Vogtle.

More recently, Westinghouse developed the NEXUS/PARAGON code suite for use with ANC and received NRC approval for its use in core design work via WCAP-16045-P-A and WCAP-16045-P-A, Addendum 1-A, supporting the application of these codes, along with ANC, to Farley and Vogtle.

RESPONSE TO RAI #2.b

WCAP-9272-P-A is currently being used at Farley and Vogtle Units 1 and 2 for the calculation of Moderator Temperature Coefficient (MTC) limits. The lattice codes used to perform nuclear calculations are not included in Vogtle TS 5.6.5.b. The Vogtle Units 1 and 2 TS 5.6.5.b will further be revised to add:

> "WCAP-16045-P-A, "Qualification of the Two-Dimensional Transport Code PARAGON," August 2004 (Methodology for Moderator Temperature Coefficient)"
>
> "WCAP-16045-P-A, Addendum 1-A, "Qualification of the NEXUS Nuclear Data Methodology," August 2007 (Methodology for Moderator Temperature Coefficient)"

As noted in the RAI, these topical reports had previously been added to Farley TS 5.6.5.b, Item 6, for Farley core design work. However, TS 5.6.5.b, Item 6, currently refers only to LCO 3.9.1 – Boron Concentration. Item 6 should also refer to LCO 3.1.3 – Moderator Temperature Coefficient. Accordingly, Farley TS 5.6.5.b will be further revised such that the Item 6 parenthetical reads as follows:

> "(Methodology for LCO 3.9.1 – Boron Concentration and LCO 3.1.3 – Moderator Temperature Coefficient.)"

Joseph M. Farley Nuclear Plant – Units 1 and 2
Vogtle Electric Generating Plant – Units 1 and 2
Response to Request for Additional Information Regarding the License Amendment Request to Revise Technical Specification Surveillance Requirement 3.1.3.2 and Specification 5.6.5

Enclosure 4

Revised FNP TS 5.6.5 (Marked)

5.6 Reporting Requirements

5.6.5 CORE OPERATING LIMITS REPORT (COLR) (continued)

3a. WCAP-12945-P-A, Volume 1, Revision 2, and Volumes 2 through 5, Revision 1, "Code Qualification Document for Best Estimate LOCA Analysis," March 1998 (W Proprietary).

3b. WCAP-12610-P-A, "Vantage+ Fuel Assembly Reference Core Report," April 1995 (W Proprietary).

(Methodology for LCO 3.2.1 - Heat Flux Hot Channel Factor and LCO 3.4.1-RCS Pressure, Temperature and Flow Departure from Nucleate Boiling Limits.)

3c. WCAP-16009-P-A, "Realistic Large Break LOCA Evaluation Methodology Using Automated Statistical Treatment of Uncertainty Method (ASTRUM)" M.E. Nissley, et al., January 2005 (Proprietary).

4. WCAP-8745-P-A, "Design Bases for the Thermal Overpower ΔT and Thermal Overtemperature ΔT Trip Functions," September 1986 (Westinghouse Proprietary)

(Methodology for Overpower ΔT and Thermal Overtemperature ΔT Trip Functions)

5. WCAP-14750-P-A Revision 1, "RCS Flow Verification Using Elbow Taps at Westinghouse 3-Loop PWRs. (Westinghouse Proprietary)

(Methodology for minimum RCS flow determination using the elbow tap measurement.)

6a. WCAP-11596-P-A, "Qualification of the Phoenix-P/ANC Nuclear Design System for Pressurized Water Reactor Cores," June 1988

---NOTE---
Commencing Unit 1 Cycle 27 and Unit 2 Cycle 24, methods 6b and 6c shall be used in lieu of method 6a.

6b. WCAP-16045-P-A, "Qualification of the Two-Dimensional Transport Code PARAGON," August 2004

6c. WCAP-16045-P-A, Addendum 1-A, "Qualification of the NEXUS Nuclear Data Methodology," August 2007

(Methodology for LCO 3.9.1 - Boron Concentration.)

and LCO 3.1.3 - Moderator Temperature Coefficient

(continued)

5.6 Reporting Requirements

5.6.5 CORE OPERATING LIMITS REPORT (COLR) (continued)

8. WCAP-13749-P-A, "Safety Evaluation Supporting the Conditional Exemption of the Most Negative EOL Moderator Temperature Coefficient Measurement," March 1997.
(Methodology for LCO 3.1.3 - Moderator Temperature Coefficient.)

7. WCAP-11397-P-A "Revised Thermal Design Procedure," April 1989

(Methodology for LCO 2.1.1-Reactor Core Safety Limits, LCO 3.4.1-RCS Pressure, Temperature and Flow Departure from Nucleate Boiling Limits.)

c. The core operating limits shall be determined such that all applicable limits (e.g., fuel thermal mechanical limits, core thermal hydraulic limits, Emergency Core Cooling Systems (ECCS) limits, nuclear limits such as SDM, transient analysis limits, and accident analysis limits) of the safety analysis are met.

d. The COLR, including any midcycle revisions or supplements, shall be provided upon issuance for each reload cycle to the NRC.

5.6.6 Reactor Coolant System (RCS) PRESSURE AND TEMPERATURE LIMITS REPORT (PTLR)

a. The reactor coolant system pressure and temperature limits, including heatup and cooldown rates and the LTOP System applicability temperature, shall be established and documented in the PTLR for the following:

LCO 3.4.3, "RCS Pressure and Temperature (P/T) Limits," and
LCO 3.4.12, "Low Temperature Overpressure Protection (LTOP) System."

b. The analytical methods used to determine the RCS pressure and temperature limits shall be those previously reviewed and approved by the NRC, specifically those described in WCAP-14040-A, Revision 4, "Methodology Used to Develop Cold Overpressure Mitigating System Setpoints and RCS Heatup and Cooldown Limit Curves," May 2004.

c. The PTLR shall be provided to the NRC upon issuance for each reactor fluence period and for any revision or supplement thereto.

5.6.7 EDG Failure Report

If an individual emergency diesel generator (EDG) experiences four or more valid failures in the last 25 demands, these failures shall be reported within 30 days. Reports on EDG failures shall include a description of the failures, underlying causes, and corrective actions taken per the Emergency Diesel Generator Reliability Monitoring Program.

(continued)

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Enclosure 5

Revised FNP TS 5.6.5 (Clean)

5.6 Reporting Requirements

5.6.5 CORE OPERATING LIMITS REPORT (COLR) (continued)

3a. WCAP-12945-P-A, Volume 1, Revision 2, and Volumes 2 through 5, Revision 1, "Code Qualification Document for Best Estimate LOCA Analysis," March 1998 (W Proprietary).

3b. WCAP-12610-P-A, "Vantage+ Fuel Assembly Reference Core Report," April 1995 (W Proprietary).

(Methodology for LCO 3.2.1 - Heat Flux Hot Channel Factor and LCO 3.4.1-RCS Pressure, Temperature and Flow Departure from Nucleate Boiling Limits.)

3c. WCAP-16009-P-A, "Realistic Large Break LOCA Evaluation Methodology Using Automated Statistical Treatment of Uncertainty Method (ASTRUM)" M.E. Nissley, et al., January 2005 (Proprietary).

4. WCAP-8745-P-A, "Design Bases for the Thermal Overpower ΔT and Thermal Overtemperature ΔT Trip Functions," September 1986 (Westinghouse Proprietary)

(Methodology for Overpower ΔT and Thermal Overtemperature ΔT Trip Functions)

5. WCAP-14750-P-A Revision 1, "RCS Flow Verification Using Elbow Taps at Westinghouse 3-Loop PWRs. (Westinghouse Proprietary)

(Methodology for minimum RCS flow determination using the elbow tap measurement.)

6a. WCAP-11596-P-A, "Qualification of the Phoenix-P/ANC Nuclear Design System for Pressurized Water Reactor Cores," June 1988

---------------------NOTE---------------------

Commencing Unit 1 Cycle 27 and Unit 2 Cycle 24, methods 6b and 6c shall be used in lieu of method 6a.

6b. WCAP-16045-P-A, "Qualification of the Two-Dimensional Transport Code PARAGON," August 2004

6c. WCAP-16045-P-A, Addendum 1-A, "Qualification of the NEXUS Nuclear Data Methodology," August 2007

(Methodology for LCO 3.9.1 - Boron Concentration and LCO 3.1.3 - Moderator Temperature Coefficient.)

(continued)

5.6 Reporting Requirements

5.6.5 CORE OPERATING LIMITS REPORT (COLR) (continued)

7. WCAP-11397-P-A "Revised Thermal Design Procedure," April 1989

(Methodology for LCO 2.1.1-Reactor Core Safety Limits, LCO 3.4.1-RCS Pressure, Temperature and Flow Departure from Nucleate Boiling Limits.)

8. WCAP-13749-P-A, "Safety Evaluation Supporting the Conditional Exemption of the Most Negative EOL Moderator Temperature Coefficient Measurement," March 1997.

(Methodology for LCO 3.1.3 - Moderator Temperature Coefficient.)

c. The core operating limits shall be determined such that all applicable limits (e.g., fuel thermal mechanical limits, core thermal hydraulic limits, Emergency Core Cooling Systems (ECCS) limits, nuclear limits such as SDM, transient analysis limits, and accident analysis limits) of the safety analysis are met.

d. The COLR, including any midcycle revisions or supplements, shall be provided upon issuance for each reload cycle to the NRC.

5.6.6 Reactor Coolant System (RCS) PRESSURE AND TEMPERATURE LIMITS REPORT (PTLR)

a. The reactor coolant system pressure and temperature limits, including heatup and cooldown rates and the LTOP System applicability temperature, shall be established and documented in the PTLR for the following:

LCO 3.4.3, "RCS Pressure and Temperature (P/T) Limits," and
LCO 3.4.12, "Low Temperature Overpressure Protection (LTOP) System."

b. The analytical methods used to determine the RCS pressure and temperature limits shall be those previously reviewed and approved by the NRC, specifically those described in WCAP-14040-A, Revision 4, "Methodology Used to Develop Cold Overpressure Mitigating System Setpoints and RCS Heatup and Cooldown Limit Curves," May 2004.

c. The PTLR shall be provided to the NRC upon issuance for each reactor fluence period and for any revision or supplement thereto.

(continued)

5.6 Reporting Requirements

5.6.7 EDG Failure Report

If an individual emergency diesel generator (EDG) experiences four or more valid failures in the last 25 demands, these failures shall be reported within 30 days. Reports on EDG failures shall include a description of the failures, underlying causes, and corrective actions taken per the Emergency Diesel Generator Reliability Monitoring Program.

5.6.8 PAM Report

When a report is required by Condition B or F of LCO 3.3.3, "Post Accident Monitoring (PAM) Instrumentation," a report shall be submitted within the following 14 days. The report shall outline the preplanned alternate method of monitoring, the cause of the inoperability, and the plans and schedule for restoring the instrumentation channels of the Function to OPERABLE status.

5.6.9 Deleted

5.6.10 Steam Generator (SG) Tube Inspection Report

A report shall be submitted within 180 days after the initial entry into MODE 4 following completion of an inspection performed in accordance with the Specification 5.5.9, Steam Generator (SG) Program. The report shall include:

a. The scope of inspections performed on each SG,

b. Degradation mechanisms found,

c. Nondestructive examination techniques utilized for each degradation mechanism,

d. Location, orientation (if linear), and measured sizes (if available) of service induced indications,

e. Number of tubes plugged during the inspection outage for each degradation mechanism,

f. The number and percentage of tubes plugged to date, and the effective plugging percentage in each steam generator.

g. The results of condition monitoring, including the results of tube pulls and in-situ testing.

5.6.11 Alternate AC (AAC) Source Out of Service Report

The NRC shall be notified if the AAC source is out of service for greater than 10 days.

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Enclosure 6

Revised VEGP TS 5.6.5 (Marked)

5.6 Reporting Requirements (continued)

5.6.5 Core Operating Limits Report (COLR)

a. Core operating limits shall be established prior to each reload cycle, or prior to any remaining portion of a reload cycle, and shall be documented in the COLR for the following:

LCO 3.1.1 "SHUTDOWN MARGIN"
LCO 3.1.3 "Moderator Temperature Coefficient"
LCO 3.1.5 "Shutdown Bank Insertion Limits"
LCO 3.1.6 "Control Bank Insertion Limits"
LCO 3.2.1 "Heat Flux Hot Channel Factor"
LCO 3.2.2 "Nuclear Enthalpy Rise Hot Channel Factor"
LCO 3.2.3 "Axial Flux Difference"
LCO 3.9.1 "Boron Concentration"

b. The analytical methods used to determine the core operating limits shall be those previously reviewed and approved by the NRC, specifically those described in the following documents:

WCAP-9272-P-A, "WESTINGHOUSE RELOAD SAFETY EVALUATION METHODOLOGY," July 1985 (W Proprietary). (Methodology for Moderator Temperature Coefficient, Shutdown Bank Insertion Limit, Control Bank Insertion Limits, and Nuclear Enthalpy Rise Hot Channel Factor.)

WCAP-10216-P-A, Revision 1A, "RELAXATION OF CONSTANT AXIAL OFFSET CONTROL FQ SURVEILLANCE TECHNICAL SPECIFICATION," February, 1994 (W Proprietary). (Methodology for Axial Flux Difference (Relaxed Axial Offset Control) and Heat Flux Hot Channel Factor (W(Z) surveillance requirements for F_Q Methodology).)

WCAP-10266-P-A, Revision 2, "The 1981 Version of the Westinghouse ECCS Evaluation Model Using the BASH Code," March 1987.

c. The core operating limits shall be determined such that all applicable limits (e.g., fuel thermal mechanical limits, core thermal hydraulic limits, Emergency Core Cooling Systems (ECCS) limits, nuclear limits such as SDM, transient analysis limits, and accident analysis limits) of the safety analysis are met.

WCAP-13749-P-A, “Safety Evaluation Supporting the Conditional Exemption of the Most Negative EOL Moderator Temperature Coefficient Measurement,” March 1997.
WCAP-16045-P-A, “Qualification of the Two-Dimensional Transport Code PARAGON,” August 2004 (Methodology for Moderator Temperature Coefficient.)
WCAP-16045-P-A, Addendum 1-A, “Qualification of the NEXUS Nuclear Data Methodology,” August 2007 (Methodology for Moderator Temperature Coefficient.)

(continued)

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Revised VEGP TS 5.6.5 (Clean)

5.6 Reporting Requirements (continued)

5.6.5 Core Operating Limits Report (COLR)

a. Core operating limits shall be established prior to each reload cycle, or prior to any remaining portion of a reload cycle, and shall be documented in the COLR for the following:

LCO 3.1.1 "SHUTDOWN MARGIN"
LCO 3.1.3 "Moderator Temperature Coefficient"
LCO 3.1.5 "Shutdown Bank Insertion Limits"
LCO 3.1.6 "Control Bank Insertion Limits"
LCO 3.2.1 "Heat Flux Hot Channel Factor"
LCO 3.2.2 "Nuclear Enthalpy Rise Hot Channel Factor"
LCO 3.2.3 "Axial Flux Difference"
LCO 3.9.1 "Boron Concentration"

b. The analytical methods used to determine the core operating limits shall be those previously reviewed and approved by the NRC, specifically those described in the following documents:

WCAP-9272-P-A, "WESTINGHOUSE RELOAD SAFETY EVALUATION METHODOLOGY," July 1985 (W Proprietary). (Methodology for Moderator Temperature Coefficient, Shutdown Bank Insertion Limit, Control Bank Insertion Limits, and Nuclear Enthalpy Rise Hot Channel Factor.)

WCAP-10216-P-A, Revision 1A, "RELAXATION OF CONSTANT AXIAL OFFSET CONTROL FQ SURVEILLANCE TECHNICAL SPECIFICATION," February, 1994 (W Proprietary). (Methodology for Axial Flux Difference (Relaxed Axial Offset Control) and Heat Flux Hot Channel Factor (W(Z) surveillance requirements for F_Q Methodology).)

WCAP-10266-P-A, Revision 2, "The 1981 Version of the Westinghouse ECCS Evaluation Model Using the BASH Code," March 1987.

WCAP-13749-P-A, "Safety Evaluation Supporting the Conditional Exemption of the Most Negative EOL Moderator Temperature Coefficient Measurement," March 1997.

WCAP-16045-P-A, "Qualification of the Two-Dimensional Transport Code PARAGON," August 2004 (Methodology for Moderator Temperature Coefficient.)

WCAP-16045-P-A, Addendum 1-A, "Qualification of the NEXUS Nuclear Data Methodology," August 2007 (Methodology for Moderator Temperature Coefficient.)

(continued)

5.6 Reporting Requirements (continued)

5.6.5 Core Operating Limits Report (COLR) (continued)

c. The core operating limits shall be determined such that all applicable limits (e.g., fuel thermal mechanical limits, core thermal hydraulic limits, Emergency Core Cooling Systems (ECCS) limits, nuclear limits such as SDM, transient analysis limits, and accident analysis limits) of the safety analysis are met.

d. The COLR, including any midcycle revisions or supplements, shall be provided upon issuance for each reload cycle to the NRC.

5.6.6 Reactor Coolant System (RCS) PRESSURE AND TEMPERATURE LIMITS REPORT (PTLR)

a. RCS pressure and temperature limits for heatup, cooldown, operation, criticality, and hydrostatic testing as well as heatup and cooldown rates shall be established and documented in the PTLR for the following:

LCO 3.4.3 "RCS Pressure and Temperature (P/T) Limits"

b. The power operated relief valve lift settings required to support the Cold Overpressure Protection Systems (COPS) and the COPS arming temperature shall be established and documented in the PTLR for the following:

LCO 3.4.12 "Cold Overpressure Protection Systems"

c. The analytical methods used to determine the RCS pressure and temperature limits shall be those previously reviewed and approved by the NRC, specifically those described in the following documents:

1. WCAP-14040-A, Rev. 4, "Methodology Used to Develop Cold Overpressure Mitigating System Setpoints and RCS Heatup and Cooldown Limit Curves."

2. WCAP-16142-P, Rev. 1, "Reactor Vessel Closure Head/Vessel Flange Requirements Evaluation for Vogtle Units 1 and 2."

3. The PTLR will contain the complete identification for each of the TS reference Topical Reports used to prepare the PTLR (i.e., report number, title, revision, date, and any supplements).

(continued)