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U. S. Nuclear Regulatory Commission
ATTN: Document Control Desk
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Joseph M. Farley Nuclear Plant
Vogtle Electric Generating Plant
Response to NRC Questions Regarding
Southern Nuclear Operating Company Response to NRC Bulletin 2004-01

Ladies and Gentlemen:

On September 16, 2004, Southern Nuclear Operating Company (SNC) received five questions by telecon from the staff concerning the July 26, 2004, Farley Nuclear Plant (FNP) and Vogtle Electric Generating Plant (VEGP) response to NRC Bulletin 2004-01, "Inspection of Alloy 82/182/600 Materials used in the Fabrication of Pressurizer Penetrations and Steam Space Piping Connections at Pressurized-Water Reactors." The SNC response to these questions is enclosed.

Mr. L. M. Stinson states he is a Vice President 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.

This letter contains no NRC commitments. If you have any questions, please advise.

Sincerely,

Respectfully submitted,

SOUTHERN NUCLEAR OPERATING COMPANY

L. M. Stinson

Sworn to and subscribed before me this 21 day of October, 2004.

Notary Public

My commission expires: 4-28-07

A110

LMS/DRG

Enclosure: SNC Response to NRC Questions Regarding the Farley Nuclear Plant and Vogtle Electric Generating Plant July 26, 2004, Response to NRC Bulletin 2004-01

cc: Southern Nuclear Operating Company
Mr. J. T. Gasser, Executive Vice President
Mr. D. E. Grissette, Vice President – Plant Vogtle
Mr. J. R. Johnson, General Manager – Plant Farley
Mr. W. F. Kitchens, General Manager – Plant Vogtle
RType: CFA04.054; CVC7000; LC# 14161

U. S. Nuclear Regulatory Commission
Dr. W. D. Travers, Regional Administrator
Mr. S. E. Peters, NRR Project Manager – Farley
Mr. C. Gratton, NRR Project Manager – Vogtle
Mr. C. A. Patterson, Senior Resident Inspector – Farley
Mr. G. J. McCoy, Senior Resident Inspector – Vogtle

Enclosure

**SNC Response to NRC Questions Regarding the
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Response to NRC Bulletin 2004-01**

**SNC Response to NRC Questions Regarding the
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Response to NRC Bulletin 2004-01**

1. NRC Question

Your response to Bulletin 2004-01 Question (1)(c) did not clearly communicate your intentions with respect to ensuring that an appropriate dialogue would be established with NRC technical staff in the event that circumferential primary water stress corrosion cracking (PWSCC) is identified at any locations covered under the scope of Bulletin 2004-01. The NRC staff addressed this issue, in part, on page 5 of Bulletin 2004-01 stating, "...the NRC staff believes that the topic of NDE scope expansion should be discussed with the NRC if circumferential PWSCC is observed in either the pressure boundary or non-pressure boundary portions of any locations covered under the scope of this bulletin to ensure that the licensee has performed an adequate extent-of-condition evaluation."

Because of the potential plant-specific and generic significance of circumferential PWSCC at locations covered under the scope of Bulletin 2004-01, it is the NRC staff's position that cognizant members of the Office of Nuclear Reactor Regulation's Materials and Chemical Engineering Branch (EMCB) should be promptly made aware of any emerging issue regarding this degradation phenomena at your facility. This is important not only for the reason cited in the passage above from Bulletin 2004-01, but also so that the NRC staff can evaluate any such information and fulfill its obligation to inform other U. S. nuclear power plant licensees of new operational experience which may be relevant to the continued safe operation of their facilities.

It is the NRC staff's expectation that if you obtain inspection results in the future which indicate that circumferential PWSCC may be occurring at any location covered under the scope of Bulletin 2004-01, you should contact your NRC headquarters Project Manager (PM) and request a teleconference or meeting with EMCB technical staff. (Please note that you should allow ample time to incorporate any insights from the aforementioned teleconference or meeting with the NRC staff into your plans for evaluating the extent of condition at your facility prior to the (sic) reaching the end of the outage during which the degradation was discovered.)

In order to document your intent to follow the guidance provided above, please provide a supplement to your Bulletin 2004-01 item (1)(c) response which states:

"If circumferential cracking is observed in either the pressure boundary or non-pressure boundary portions of any locations covered under the scope of this bulletin, (we) will develop plans to perform an adequate extent-of-condition evaluation and (we) will discuss those plans with cognizant NRC technical staff prior to restarting the affected unit."

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SNC Response

The pressurizer connections affected by this Bulletin at both FNP and VEGP are limited to Alloy 82/182 full penetration nozzle to safe-end welds at 5 locations per unit (one 4" spray nozzle and four 6" Safety/Relief nozzles). There are no non-pressure boundary portions of any locations covered by this Bulletin at FNP or VEGP. The FNP and VEGP pressurizer steam space connections were designed to accommodate the visual, surface, and volumetric examinations of the ASME Code, Section XI, "Rules for Inservice Inspection of Nuclear Power Plant Components." Future FNP and VEGP Alloy 82/182 to safe-end connections will receive current, fully qualified performance demonstration initiative (PDI) volumetric examinations. While not expected in these nozzle to safe-end welds, circumferential flaws, if discovered, would represent a more serious safety concern than axial flaws. Therefore, if circumferential cracking is observed in the pressure boundary portions of any locations covered under the scope of this Bulletin, SNC will develop plans to perform an adequate extent-of-condition evaluation and SNC will discuss those plans with cognizant NRC technical staff prior to restarting the affected unit.

2. NRC Question

Item 1(c) in Bulletin 2004-01 states in part, "The description should include the areas, penetrations and steam space piping connections to be inspected; the extent (percentage) of coverage to be achieved for each location..." The SNC response to item 1 (c) does not state, "the extent (percentage) of coverage to be achieved for each location." Please provide this information in your response to item 1(c) in Bulletin 2004-01. The Westinghouse Owners Group (WOG) recommends that licensees should perform the bare metal visual inspection 360 degrees around each location.

SNC Response

In accordance with the WOG recommendation, 100% bare metal visual (BMV) examinations (which include examining 360° around each Alloy 82/182 connection) were performed on the pressurizer steam space Alloy 82/182 connections at FNP during the FNP Unit 2 spring 2004 refueling outage and at VEGP during the VEGP Unit 2 spring 2004 refueling outage. The WOG recommended 100% BMV examinations on the pressurizer steam space Alloy 82/182 connections at FNP and VEGP are also scheduled for the next refueling outages for each plant (FNP Unit 1 fall 2004 and VEGP Unit 1 spring 2005). These examinations on FNP Units 1 & 2 and VEGP Units 1 & 2 will continue to be

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performed on nozzles addressed in this bulletin at each refueling outage until specific industry guidance is available.

3. NRC Question

Page 7 of Bulletin 2004-01 states in part, "Plant TSs pertain to this issue insofar as they do not allow operation with known through-wall reactor coolant system pressure boundary leakage." Since it appears that the licensee has not made provision in their response to item 1(c) of the bulletin, to examine the Alloy 82/182/600 components of the pressurizer during subsequent refueling outages, please clarify how they intend on meeting the requirement that, "...they do not allow operation with known through-wall reactor coolant system pressure boundary leakage." The NRC staff recognizes that there have already been leaks in pressurizer components and understands that the licensee has not taken steps shown to be 100 percent effective in preventing cracks in these components.

SNC Response

In addition to the ASME Code, Section XI required examinations, FNP and VEGP will continue performing WOG recommended 100% BMV examinations of the Alloy 82/182/600 nozzles addressed in this bulletin at each subsequent refueling outage until specific industry guidance is available.

4. NRC Question

Item 1(c) in Bulletin 2004-01 requests that the licensee provide the basis for concluding that their plant will satisfy applicable regulatory requirements related to the structural and leakage integrity of pressurizer penetrations and steam space piping connections. Please supplement your response to provide this basis.

SNC Response

The completion of volumetric, surface, and visual examinations of the Alloy 82/182 full penetration nozzle to safe-end welds addressed in this Bulletin without any evidence of recordable, relevant indications, through-wall leakage, or any recordable wastage of the low alloy steel surface is assurance of the prior integrity of the Alloy 82/182 connections. Ongoing integrity of the FNP and VEGP pressurizer steam space Alloy 82/182 connections is assured by performing, at a minimum, 100% BMV examinations (which include examining 360° around each Alloy 82/182 connection) each refueling outage (approximately every 18 months).

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FNP and VEGP plan to continue performing 100% BMV examinations of the nozzles addressed in this bulletin at each refueling outage until specific industry guidance is available. The specific regulatory requirements are listed below with the associated response addressing how each requirement is met.

Compliance with Design Requirements: 10 CFR 50. Appendix A - General Design Criteria (GDC)

Criterion 14 - Reactor Coolant Pressure Boundary

"The reactor coolant pressure boundary shall be designed, fabricated, erected and tested so as to have an extremely low probability of abnormal leakage, of rapidly propagating failure, and of gross rupture."

The reactor coolant system pressure boundary at both FNP and VEGP is designed to accommodate the system pressures and temperatures attained under all expected modes of plant operation, including all anticipated transients, and to maintain the stresses within applicable stress limits. The system is protected from overpressure by means of pressure-relieving devices as required by applicable codes. Materials of construction are specified to minimize corrosion and erosion and to provide a structural system boundary throughout the life of the plant. Fracture prevention measures are taken to prevent brittle fracture. Inspections in accordance with applicable codes and provisions are made for surveillance of critical areas to enable periodic assessment of the boundary integrity. These controls assure that the reactor coolant pressure boundary maintains an extremely low probability of rapidly propagating failure and gross rupture.

Also, in accordance with WOG recommendations, the 100% BMV examination technique performed on the pressurizer steam space Alloy 82/182 connections at FNP and VEGP during the FNP Unit 2 spring 2004 refueling outage and during the VEGP Unit 2 spring 2004 refueling outage is a reliable means for identifying the very low leakage rates potentially associated with alloy 82/182 cracking. The WOG recommended 100% BMV examinations on the pressurizer steam space Alloy 82/182 connections at FNP and VEGP are also scheduled for the next refueling outages for each plant (FNP Unit 1 fall 2004 and VEGP Unit 1 spring 2005). These examinations for FNP Units 1 & 2 and VEGP Units 1 & 2 will continue to be performed on nozzles addressed in this bulletin at each refueling outage until specific industry guidance is available. Therefore, based on the design, materials, and examination methods, the FNP and VEGP pressurizers continue to comply with the requirements of GDC 14.

In addition, as stated in the July 26, 2004, SNC response to NRC Bulletin 2004-01, zinc addition was implemented on Farley Unit 2 in its 10th operating cycle in 1994 and was implemented on Farley Unit 1 in its 16th operating cycle in 1999. Vogtle Unit 1 zinc addition was implemented during its 12th operating cycle in August 2004, and is planned for Vogtle Unit 2 during its 11th operating cycle in March 2005. EPRI Report 1003522 / MRP-78 has shown zinc addition to be beneficial in mitigating the initiation of PWSCC in Alloy 600.

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Other mitigation applications are also being considered for both Farley and Vogtle. SNC is participating in WOG projects concerning Mechanical Stress Improvement Process for Pressurizers and is considering implementing this process at both FNP and VEGP. Also, VEGP is considering weld overlay as a mitigation application to increase ultrasonic inspection coverage due to complex "as-built" configurations.

Criterion 31 - Fracture Prevention of Reactor Coolant Pressure Boundary

"The reactor coolant pressure boundary shall be designed with sufficient margin to assure that when stressed under operating, maintenance, testing, and postulated accident conditions (1) the boundary behaves in a non-brittle manner, and (2) the probability of rapidly propagating fracture is minimized. The design shall reflect consideration of service temperatures and other conditions of the boundary material under operating, maintenance, testing and postulated accident conditions and the uncertainties in determining (1) material properties, (2) the effects of irradiation on material properties, (3) residual, steady state and transient thermal stresses, and (4) size of flaws."

The FNP and VEGP pressurizer steam space connections are designed to conform with the intent of Criterion 31. The reactor coolant pressure boundary, which includes the pressurizer steam space Alloy 82/182 connections, is designed so that, for all transients, normal, upset, and faulted, the reactor coolant pressure boundary behaves in a non-brittle manner. Ongoing WOG recommended 100% BMV examinations of the pressurizer steam space connections at FNP and VEGP will assure sufficient margin from rapidly propagating fracture until specific industry guidance is available.

Criterion 32 - Inspection of Reactor Coolant Pressure' Boundary

"Components which are part of the reactor coolant pressure boundary shall be designed to permit (1) periodic inspection and testing of important areas and features, to assess their structural and leak tight integrity, and (2) an appropriate material surveillance program for the reactor pressure vessel."

The FNP and VEGP pressurizer steam space connections were designed to accommodate the visual, surface, and volumetric examinations of the ASME Code, Section XI. Future FNP and VEGP Alloy 82/182 to safe-end connections will receive current, fully qualified performance demonstration initiative (PDI) volumetric examinations. In addition, the ongoing WOG recommended 100% BMV examinations performed on the pressurizer steam space Alloy 82/182 connections at FNP and VEGP will assure the structural and leak tight integrity of the pressurizer steam space connections at both FNP and VEGP.

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Compliance with Operating Requirement: 10 CFR 50.36 - Plant Technical Specifications

FNP and VEGP Technical Specifications include requirements and associated action statements addressing reactor coolant pressure boundary (RCPB) leakage. The FNP and VEGP Technical Specification limits for reactor coolant system operational leakage are one gallon per minute (gpm) for unidentified leakage, 10 gpm for identified leakage, and no pressure boundary leakage (reference FNP and VEGP Technical Specifications Section 3.4.13, "RCS Operational Leakage"). Compliance with the zero non-isolable leakage criteria is met by conducting inspections and repairs in accordance with ASME Code, Section XI, and 10 CFR 50.55a, "Codes and Standards," as described below.

The unidentified leakage limit of one gpm is established as a quantity which can be accurately measured while sufficiently low to ensure early detection of leakage.

Leakage of this magnitude can be reasonably detected within a short time, thus providing confidence that cracks associated with such leakage will not develop into a critical size before mitigating actions can be taken. If a through-wall boundary leak is detected by reactor coolant system (RCS) leakage detection instrumentation or mass balance calculations, the plant must be shut down if the leak is determined to be the result of a non-isolable RCS pressure boundary fault.

Compliance with Inspection Requirements: 10 CFR 50.55a and the ASME Code, Section XI

10 CFR 50.55a, "Codes and Standards," requires that inservice inspection and testing be performed in accordance with the requirements of the ASME Code, Section XI, "Inservice Inspection of Nuclear Plant Components." Section XI contains applicable rules for examination, evaluation, and repair of code class components, including the RCPB.

However, it should be noted that in the July 26, 2004, SNC response to NRC Bulletin 2004-01, Risk Informed inservice inspection programs have been implemented at both Farley and Vogtle which have been approved by the NRC. The surface examinations for these butt weld configurations are no longer required. However, the WOG recommended 100% bare metal visual (BMV) examinations (which include examining 360° around each Alloy 82/182 connection) were performed on the pressurizer steam space Alloy 82/182 connections at FNP during the FNP Unit 2 spring 2004 refueling outage and at VEGP during the VEGP Unit 2 spring 2004 refueling outage. The WOG recommended 100% BMV examinations on the pressurizer steam space Alloy 82/182 connections at FNP and VEGP are also scheduled for the next refueling outages for each plant (FNP Unit 1 fall 2004 and VEGP Unit 1 spring 2005). These examinations at FNP Units 1 & 2 and VEGP Units 1 & 2 will continue to be performed on nozzles addressed in this bulletin at each refueling outage until specific industry guidance is available. Should BMV of any nozzles reveal potential leaking penetrations, analysis of the residue and surface examinations will be performed for confirmation. If confirmed,

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volumetric inspections (ultrasonic, if possible) of the nozzles will be performed for flaw characterization. For VEGP, it is expected that the 6" nozzle configurations will have ultrasonic limitations. Surface conditioning will be performed to the extent practical to maximize ultrasonic coverage. A best effort qualified Appendix VIII examination will be performed. Radiography (RT) may be used to assist in characterization.

Per 10 CFR 50.55a, by reference to the ASME Code, through-wall degradation is not permitted. Scope expansion requirements will be performed to the requirements of ASME Code, Section XI. While not expected in these butt weld configurations, circumferential flaws, if discovered, would represent a more serious safety concern than axial flaws. If circumferential cracking is observed in the pressure boundary portions of any locations covered under the scope of this bulletin, SNC will develop plans to perform an adequate extent-of-condition evaluation and SNC will discuss those plans with cognizant NRC technical staff prior to restarting the effected unit.

Compliance with Quality Assurance Requirements: 10 CFR 50, Appendix B

Criterion V of Appendix B to 10 CFR 50

Activities affecting quality shall be prescribed by documented instructions, procedures, or drawings, of a type appropriate to the circumstances and shall be accomplished in accordance with these instructions, procedures, or drawings. Instructions, procedures, or drawings shall include appropriate quantitative or qualitative acceptance criteria for determining that important activities have been satisfactorily accomplished.

The ASME Code, Section XI required visual examinations are performed using procedures that contain specific acceptance criteria or detailed recording criteria that are subsequently evaluated for acceptability. The visual examinations are performed using detailed instructions with a combination of qualitative and quantitative standards for the essential examination variables. WOG recommended 100% BMV examinations of the pressurizer steam space Alloy 82/182 connections at FNP and VEGP will be performed using standardized SNC procedures, which include appropriate acceptance criteria.

Criterion IX of Appendix B to 10 CFR 50

Criterion IX of Appendix B to 10 CFR 50 states that special processes, including nondestructive testing, shall be controlled and accomplished by qualified personnel using qualified procedures in accordance with applicable codes, standards, specifications, criteria, and other special requirements.

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The pressurizer steam space connection WOG recommended 100% BMV examinations at FNP and VEGP will be performed by certified Level II or Level III examiners using SNC approved procedures with additional detailed instructions, as necessary.

Criterion XVI of Appendix B to 10 CFR 50

Criterion XVI of Appendix B to 10 CFR 50 states that measures shall be established to assure that conditions adverse to quality are promptly identified and corrected. For significant conditions adverse to quality, the measures taken shall include root cause determination and corrective action to preclude repetition of the adverse conditions.

The identification of an unacceptable visual indication requires repair, replacement, or acceptance by analytical evaluation. In all cases, these indications would be tracked by the SNC Corrective Action Program (CAP). In the case of a significant adverse condition, the CAP requires determination of the cause of the failure, evaluation of the extent of condition, and assignment of appropriate corrective actions to preclude recurrence. The SNC CAP meets the requirements of 10 CFR 50, Appendix B, Criterion XVI.

5. NRC Question

Item 1(d) in Bulletin 2004-01 states, "In light of the information discussed in this bulletin and your understanding of the relevance of recent industry operating experience to your facility, explain why the inspection program identified in your response to item (1)(c) above is adequate for the purpose of maintaining the integrity of your facility's RCPB (reactor coolant pressure boundary) and for meeting all applicable regulatory requirements which pertain to your facility." Southern Nuclear Operating Company's response to this item did not provide this explanation. Please provide this explanation.

SNC Response

The basis for concluding that the FNP and VEGP inspection programs are adequate for the purpose of maintaining the integrity of the FNP and VEGP RCPB and meeting all applicable regulatory requirements related to the structural and leakage integrity of the pressurizer penetrations and steam space connections is provided in the SNC response to NRC question number 4 above.