VIRGINIA ELECTRIC AND POWER COMPANY
RICHMOND, VIRGINIA 23261

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United States Nuclear Regulatory Commission
Attention: Document Control Desk
Washington, D.C. 20555

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VIRGINIA ELECTRIC AND POWER COMPANY
SURRY POWER STATION UNITS 1 AND 2
ASME SECTION XI INSERVICE INSPECTION PROGRAM
SYSTEM PRESSURE TEST RELIEF REQUESTS
RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION

In a letter dated January 10, 2005, Virginia Electric and Power Company (Dominion) submitted Relief Requests SPT-005 through SPT-007 for Surry Power Station Unit 1 and Relief Requests SPT-004 through SPT-006 for Surry Power Station Unit 2 for NRC review and approval. During the course of their review, the NRC staff determined that additional information was necessary to complete their review. Consequently, in a letter dated June 6, 2005, the NRC requested additional information to facilitate their review of the relief requests. The NRC's questions and Dominion's responses are provided in the enclosure.

If you have any questions or require additional information, please contact Mr. Gary D. Miller at (804) 273-2771.

Very truly yours,

Leslie N. Hartz
Vice President – Nuclear Engineering

Enclosure

Commitments made by this letter: None

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Enclosure

Response to NRC Request for Additional Information

System Pressure Testing Relief Requests
SPT-005, 006, and 007 for Surry Unit 1
SPT-004, 005 and 006 for Surry Unit 2

Virginia Electric and Power Company
(Dominion)
Surry Power Station Units 1 and 2

System Pressure Testing Relief Requests
SPT-005, 006, and 007 for Surry Unit 1
SPT-004, 005 and 006 for Surry Unit 2

Response to NRC Request for Additional Information

In accordance with 10 CFR 50.55a(a)(3)(ii), Dominion submitted the subject relief requests for ASME Code pressure test requirements on Class 1 components and piping. As stated in 10 CFR 50.55a(a)(3)(ii), licensees may propose an alternative to ASME Code requirements if a hardship or unusual difficulty would be incurred by performing the requirement. The licensee must adequately state the hardship or unusual difficulty, and demonstrate that no compensating level of quality or safety would be realized by performing the inspection or test requirements by the ASME Code. The NRC reviewed Dominion's submittal and, based on this review, determined that additional information is required to complete their evaluation. The NRC's questions and Dominion's responses are provided below.

NRC

2.1 General Information

2.1(a) Please provide the start and end dates for the fourth 10-year inspection at Surry, units 1 and 2.

Dominion

Surry Unit 1 – October 14, 2003 to October 13, 2013
Surry Unit 2 – May 10, 2004 to May 9, 2014

NRC

2.2 Requests for Additional Information for Surry, Unit 1

2.2.1 Request for Relief request SPT-005, Examination Category B-P, Pressure Retaining Components in the Residual Heat Removal and Safety Injection Systems

2.2.1(a) For each of the piping segments listed in Relief Request SPT-005, please state the piping material, nominal pipe size, and overall length of the segment.

Dominion

Segment	Material	Size/(Approximate Length)
1-SI-109, 1-SI-107 and 1-SI-HCV-1850B	austenitic stainless steel (A-376-TP316 typical)	12" (12') & ¾" (8')
1-SI-130, 1-SI-128, 1-SI-HCV-1850D, and 1-RH-MOV-1720A	austenitic stainless steel (A-376-TP316 typical)	12" (90'), 10" (127'), 1" (1'), & ¾" (3')
1-SI-147, 1-SI-145, 1-SI-HCV-1850F, and 1-RH-MOV-1720B	austenitic stainless steel (A-376-TP316 typical)	12" (91'), 10" (25'), & ¾" (6')

NRC

2.2.1(b) Request for relief SPT-005 states that, "the areas between [valves] 1-SI-108 and 1-SI-HCV-1850B, 1-SI-129, and 1-SI-HCV-1850D, and 1-SI-146 and 1-SI-HCV-1850F would also be examined at or near the end of the interval by using an external pressurization source, or by opening the isolation valves separating the lines from the safety injection accumulator pressure. The test pressure would again correspond to safety injection accumulator nominal operating pressure."

Please explain why the subject piping segments cannot be pressurized to a test pressure approaching the nominal reactor coolant system (RCS) pressure associated with 100-percent rated reactor power. Discuss the methods that have been considered to increase the test pressure for these segments. For instance, can the safety injection system running in recirculation mode be used to pressurize these segments to higher pressures than 660 psig, as listed in the submitted alternative? Describe any methods by which the 10-year leakage test pressure for these piping segments may be increased and why these methods would present a hardship or unusual difficulty.

Also, if the piping segments listed above can be pressurized to the required test pressure or test pressures higher than safety injection operating pressure, discuss why all the pipe segments listed in the relief request could not be pressurized to pressures higher than the 660 psig stated in the alternative by using the same external source. If the Surry technical specifications (TS) prevent such a pressurization or if injecting water inventory into the RCS is a concern, discuss what maximum test pressure could be used as an alternative leakage test.

Dominion

There are no vents or drains within the piping in question to allow direct pressurization from an external source with the valves noted above closed. Other pressurization sources were considered.

The piping upstream of valves 1-SI-HCV-1850B, 1-SI-HCV-1850D, and 1-SI-HCV-1850F has a design pressure of 600 psig (¾"-SI-29-602, ¾"-SI-28-602, and ¾"-SI-27-602). Testing the area of concern from the upstream direction would be limited by the 600 psig design pressure. Testing the area from the downstream side is possible using the normal accumulator tank pressure of approximately 660 psig. Additionally, an external pressurization source could be used to develop higher pressures. This was the only method determined to allow higher pressures and was discussed in the original relief request. A check valve boundary would be required with the RCS pressure set at a higher pressure than the test pressure used. The pressure differential would be used to maintain valve (1-SI-109, 1-SI-130, and 1-SI-147) closure during the test. As indicated in the relief request, performing this type of test is very difficult and creates the potential of introducing the test fluid into the primary (which is a reactivity control issue). Specifically, the use of a positive displacement pump and the nature of incompressible fluids introduces the potential for burping open the check valve that separates the test boundary from the RCS. This could potentially result in a reactivity change.

Surry has high pressure safety injection (HPSI) pumps. The pumps are cross-connected to the area in question to allow flushing of lines in a recirculation valve line-up. However, the pressure for the flush is again limited by the 600 psig design pressure piping upstream of the area in question where the HPSI piping connects (¾"-SI-42-602, ¾"-SI-43-602, and ¾"-SI-44-602).

The test pressure of 660 psig was chosen as the optimal test pressure, allowing pressurization from either direction. The pressure is equivalent to the pressure proposed for the other areas discussed in the relief request. Additionally, the piping in question is normally isolated. As such, the piping in question is located beyond the second isolation valve from the primary, i.e., the normal Class 2 interface. Consequently, the proposed nominal operating pressure for the Class 2 side (660 psig) is appropriate for this Class 1 test.

NRC

2.2.2 Request for Relief SPT-006, Examination Category B-P, Pressure-Retaining Components in the Residual Heat Removal System

2.2.2(a) For the piping segment listed in Relief Request SPT-006, please state the piping material, nominal pipe size, and overall length of the segment.

Dominion

Segment	Material	Size/(Approximate Length)
1-RH-MOV-1700 and 1-RH-MOV-1701	austenitic stainless steel, (A-376-TP316 typical)	14" (32')

NRC

2.2.2(b) For the piping segment associated with relief request SPT-006, the licensee states that the valve 1-RH-MOV-1700 is prevented from being opened by a pressure interlock. The function of the interlock is to prevent the low-pressure RHR piping from being overpressurized by the RCS. Please verify that the Surry Unit 1 TS prevent 1-RH-MOV-1700 from being opened during modes of plant operation when the RCS pressure is at 100-percent rated power.

Dominion

The Surry Technical Specifications (TS) Section 3.5 Basis states, "The NRC requires that the series motorized valves in the line connecting the RHRS and RCS be provided with pressure interlocks to prevent them from operating when the reactor coolant system is at pressure." The Surry Updated Final Safety Analysis Report (UFSAR) describes the interlock in Section 9.3.3.2 stating, "Both valves are interlocked with reactor coolant system pressure so that, if the reactor coolant system pressure exceeds a set pressure, the valves do not open." A discussion of the operation of the RHR valve pressure interlock is also provided in our June 11, 1980 response to IE Bulletin 80-12, "Decay Heat Removal System Operability."

NRC

2.2.2(c) The proposed alternative does not clearly state what the exact test pressure and temperature conditions will be, or when the licensee proposes to conduct the system leakage test that is being proposed, including test pressure, test temperature, and plant status.

Dominion

The intent is to test the Class 1 piping (between 1-RH-MOV-1700 and 1-RH-MOV-1701) with the adjoining Class 2 piping pressure test. The Class 2 test is conducted once a period, which would result in two additional VT-2 examinations at pressure on the Class 1 piping when compared to the current Class 1 extended boundary end of interval requirements. The RHR system is placed in operation when the reactor coolant temperature has been reduced to approximately 350°F and the reactor coolant pressure

is between 300 and 350 psig. The pressure test that will be used for the Class 1 piping was written to be conducted soon after RHR is placed in operation to obtain the higher pressures and temperatures experienced during RHR system operation, but within the operating parameters described above. Additionally, the Class 1 piping will continue to receive a VT-2 examination as part of the Class 1 system leakage test following reactor refueling and prior to startup. (Note: During the Class 1 leakage test the extended boundary is not normally pressurized).

NRC

2.2.3 Request for Relief SPT-007, Examination Category B-P, Pressure-Retaining Components in the Class 1 Extended Boundary

2.2.3(a) Relief Request SPT-007, as written, seems to object to the scheduling (e.g., "following refueling outage") of the leakage test as required by IWB-5220. Please verify that the system leakage test proposed as an alternative in Relief Request SPT-007 will be performed at 2235 psig and that all other requirements of IWB-5200 for the end of interval test will be met. Also, please describe what tests will be conducted on systems, or portions of systems, prior to plant start-up that are opened for inspection during the refueling outage.

Dominion

The ASME Code is currently addressing the "following a refueling outage" terminology in the code for the Class 1 extended boundary test. The ASME committee is still working on the appropriate language but has agreed in principle that it was not the intent of the Code to change the test requirement when Code Case N-498 was incorporated into the Section XI Code. As indicated in ASME inquiry IN04-002, the N-498 (-1, -2, -3, -4) test may be conducted anytime prior to startup at or near the end of the interval. Therefore, Dominion has submitted an intent inquiry to document the ASME Code position. If the reply verifies that ASME did not intend to change the Code as currently written, then it is our position that this relief request (SPT-007) would be unnecessary since the Code as written would be in error. As this relief request is not necessary until the end of interval testing, SPT-007 is being withdrawn at this time to allow time for the resolution of this issue. If the ASME reply is different than anticipated, Dominion will consider re-submittal of this relief request at that time.

NRC

2.2.3(b) In Request for Relief for SPT-007, general relief for all Class 1 components in the extended Class 1 boundary was requested. The NRC staff does not typically grant blanket requests for relief. For Relief requests SPT-005 and -006, specific piping segments that require relief have been listed. For each of the piping segments that require relief under SPT-007, please state the specific system piping segments included

in the subject request. Include the piping material, nominal pipe size, and overall length of the segment, and adequately describe the hardship or unusual difficulty associated with the ASME Code requirements from which relief is being sought.

Dominion

As noted above, Relief Request SPT-007 is withdrawn.

NRC

2.2.3(c) The proposed alternative does not clearly state what the exact test pressure and temperature conditions will be, or when the licensee proposes to conduct the system leakage test. Please state the alternative system leakage test that is being proposed, including test pressure, test temperature, and plant status.

Dominion

As noted above, Relief Request SPT-007 is withdrawn.

NRC

2.3 Requests for Additional Information for Surry, Unit 2

2.3.1 Request for Relief request SPT-004, Examination Category B-P, Pressure Retaining Components in the Residual Heat Removal and Safety Injection Systems

2.3.1(a) For each of the piping segments listed in Relief Request SPT-004, please state the piping material, nominal pipe size, and overall length of the segment.

Dominion

Segment	Material	Size/(Approximate Length)
2-SI-109, 2-SI-107 and 2-SI-HCV-2850B	austenitic stainless steel (A-376-TP316 typical)	12" (92') & ¾" (2')
2-SI-130, 2-SI-128, 2-SI-HCV-2850D, and 2-RH-47	austenitic stainless steel (A-376-TP316 typical)	12" (86'), 10" (9'), & ¾" (3')
2-SI-147, 2-SI-145, 2-SI-HCV-2850F, and 2-RH-MOV-2720B	austenitic stainless steel (A-376-TP316 typical)	12" (94'), 10" (23'), & ¾" (3')

NRC

2.3.1(b) Request for relief SPT-004 states that, "the areas between [valves] 2-SI-108 and 2-SI-HCV-2850B, 2-SI-129, and 2-SI-HCV-2850D, and 2-SI-146 and 2-SI-HCV-2850F would also be examined at or near the end of the interval by using an external pressurization source, or by opening the isolation valves separating the lines from the safety injection accumulator pressure. The test pressure would again correspond to safety injection accumulator nominal operating pressure."

Please explain why the subject piping segments cannot be pressurized to a test pressure approaching the nominal reactor coolant system (RCS) pressure associated with 100-percent rated reactor power. Discuss the methods that have been considered to increase the test pressure for these segments. For instance, can the safety injection system running in recirculation mode be used to pressurize these segments to higher pressures than 660 psig, as listed in the submitted alternative? Describe any methods by which the 10-year leakage test pressure for these piping segments may be increased and why these methods would present a hardship or unusual difficulty.

Also, if the piping segments listed above can be pressurized to the required test pressure or test pressures higher than safety injection operating pressure, discuss why all the pipe segments listed in the relief request could not be pressurized to pressures higher than the 660 psig stated in the alternative by using the same external source. If the Surry technical specifications (TS) prevent such a pressurization or if injecting water inventory into the RCS is a concern, discuss what maximum test pressure could be used as an alternative leakage test.

Dominion

There are no vents or drains within the piping in question to allow direct pressurization from an external source with the valves noted above closed. Other pressurization sources were considered.

The piping upstream of valves 2-SI-HCV-2850B, 2-SI-HCV-2850D, and 2-SI-2850F have a design pressure of 600 psig (¾"-SI-229-602, ¾"-SI-228-602, and ¾"-SI-227-602). Testing the area of concern from the upstream direction would be limited by the 600 psig design pressure. Testing the area from the downstream side is possible using the normal accumulator tank pressure of approximately 660 psig. Additionally, an external pressurization source could be used to develop higher pressures. This was the only method determined to allow higher pressures and was discussed in the original relief request. A check valve boundary would be required with the RCS pressure set at a higher pressure than the test pressure used. The pressure differential would be used to maintain valve (2-SI-109, 2-SI-130, and 2-SI-147) closure during the test. As indicated in the relief request, performing this type of test is very difficult and creates the potential of introducing the test fluid into the primary (which is a reactivity control issue). Specifically, the use of a positive displacement pump and the nature of incompressible

fluids introduces the potential for burping open the check valve that separates the test boundary from the RCS. This could potentially result in a reactivity change.

Surry has high pressure safety injection (HPSI) pumps. The pumps are cross-connected to the area in question to allow flushing of lines in a recirculation valve line-up. However, the pressure for the flush is again limited by the 600 psig design pressure piping upstream of the area in question, where the HPSI piping connects (¾"-SI-242-602, ¾"-SI-243-602, and ¾"-SI-244-602).

The test pressure of 660 psig was chosen as the optimal test pressure, allowing pressurization from either flow direction. The pressure is equivalent to the pressure proposed for the other areas discussed in the relief request. Additionally, the piping in question is normally isolated. As such, the piping in question is located beyond the second isolation valve from the primary, i.e., the normal Class 2 interface. Consequently, the proposed nominal operating pressure for the Class 2 side (660 psig) is appropriate for this Class 1 test.

NRC

2.3.2 Request for Relief SPT-005, Examination Category B-P, Pressure-Retaining Components in the Residual Heat Removal System

2.3.2(a) For the piping segment listed in Relief Request SPT-005, please state the piping material, nominal pipe size, and overall length of the segment.

Dominion

Segment	Material	Size/(Approximate Length)
2-RH-MOV-2700 and 2-RH-MOV-2701	austenitic stainless steel, (A-376-TP316 typical)	14" (33')

NRC

2.3.2(b) Relief request SPT-005 states that valve 2-RH-MOV-2700 is prevented from being opened by a pressure interlock. The function of the interlock is to prevent the low-pressure RHR piping from being overpressurized by the RCS. Please verify that the Surry, Unit 2 TS prevent 2-RH-MOV-2700 from being opened during modes of plant operation when the RCS pressure is at 100-percent rated power.

Dominion

The Surry TS Section 3.5 Basis states, "The NRC requires that the series motorized valves in the line connecting the RHRS and RCS be provided with pressure interlocks to prevent them from operating when the reactor coolant system is at pressure." The UFSAR describes the interlock in Section 9.3.3.2 stating, "Both valves are interlocked with reactor coolant system pressure so that, if the reactor coolant system pressure exceeds a set pressure, the valves do not open." A discussion of the operation of the RHR valve pressure interlock is also provided in our June 11, 1980 response to IE Bulletin 80-12, "Decay Heat Removal System Operability."

NRC

2.3.2(c) The licensee's alternative states that the subject piping segment will be examined for evidence of leakage at Class 2 pressure test requirements. Clearly state the actual test pressure and temperatures that will be applied to this segment during the system leakage test. In addition, describe the nominal system operating pressure for this segment of piping.

Dominion

The intent is to test the Class 1 piping (between 2-RH-MOV-2700 and 2-RH-MOV-2701) with the adjoining Class 2 piping pressure test. The Class 2 test is conducted once a period, which would result in two additional VT-2 examinations at pressure on the Class 1 piping when compared to the current Class 1 extended boundary end of interval requirements. The RHR system is placed in operation when the reactor coolant temperature has been reduced to approximately 350°F and the reactor coolant pressure is between 300 and 350 psig. The pressure test that will be used for the Class 1 piping was written to be conducted soon after RHR is placed in operation to obtain the higher pressures and temperatures experienced during RHR system operation, but within the operating parameters described above. Additionally, the Class 1 piping will continue to receive a VT-2 examination as part of the Class 1 system leakage test following reactor refueling and prior to startup. (Note: During the Class 1 leakage test the extended boundary is not normally pressurized).

NRC

2.3.3 Request for Relief SPT-006, Examination Category B-P, Pressure-Retaining Components in the Class 1 Extended Boundary

2.3.3(a) Relief Request SPT-006, as written, seems to object to the scheduling (e.g., "following refueling outage") of the leakage test as required by IWB-5220. Please verify that the system leakage test proposed as an alternative in Relief Request SPT-006 will be performed at 2235 psig and that all other requirements of IWB-5200 for the end of

interval test will be met. Also, please describe what tests will be conducted on systems, or portions of systems, prior to plant start-up that are opened for inspection during the refueling outage.

Dominion

The ASME Code is currently addressing the "following a refueling outage" terminology in the code for the Class 1 extended boundary test. The ASME committee is still working on the appropriate language but has agreed in principle that it was not the intent of the Code to change the test requirement when Code Case N-498 was incorporated into the Section XI Code. As indicated in ASME inquiry IN04-002, the N-498 (-1, -2, -3, -4) test may be conducted at any time prior to startup at or near the end of the interval. Therefore, Dominion has submitted an intent inquiry to document the ASME Code position. If the reply verifies that ASME did not intend to change the Code as currently written, then it is our position that this relief request (SPT-006) would be unnecessary as the Code as written would be in error. As this relief request is not necessary until the end of interval testing, SPT-006 is being withdrawn at this time. If the ASME reply is different than anticipated, Dominion will consider re-submittal of this relief request at that time.

NRC

2.3.3(b) In Request for Relief for SPT-006, general relief for all Class 1 components in the extended Class 1 boundary was requested. The NRC staff does not typically grant blanket requests for relief. For relief requests SPT-004 and -005, specific piping segments that require relief have been listed. For each of the piping segments that require relief under SPT-006, please state the specific system piping segment and include the piping material, nominal pipe size, and overall length of the segment, and adequately describe the hardship or unusual difficulty associated with the ASME Code requirements from which relief is being sought.

Dominion

As noted above, Relief Request SPT-006 is withdrawn.

NRC

2.3.3(c) The proposed alternative does not clearly state what the exact test pressure and temperature conditions will be, or when the licensee proposes to conduct the system leakage test. Please state the alternative system leakage test that is being proposed, including test temperature, and plant status.

Dominion

As noted above, Relief Request SPT-006 is withdrawn.