VIRGINIA ELECTRIC AND POWER COMPANY
RICHMOND, VIRGINIA 23261

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United States Nuclear Regulatory Commission
Attention: Document Control Desk
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Gentlemen:

VIRGINIA ELECTRIC AND POWER COMPANY
SURRY POWER STATION UNITS 1 AND 2
NORTH ANNA POWER STATION UNITS 1 AND 2
INSERVICE INSPECTION PROGRAM
MAIN STEAM NON-RETURN VALVE TESTING

Our letter dated February 21, 1992 for North Anna and Surry Power Stations requested interim relief from ASME Code, Section XI, IWV-3250, "Test for Check Valves," requirements for exercising and closure testing of the main steam non-return check valves. The interim relief was necessary to provide time to develop an acceptable alternate test method, in accordance with the guidance provided in Generic Letter 89-04, "Guidance on Developing Acceptable Inservice Testing Programs." Interim relief was granted by the NRC for North Anna on December 4, 1992 and for Surry on January 19, 1993.

Alternate test methods have been evaluated at Surry Unit 2 during the March 1993 plant cooldown for a refueling outage. Based on this evaluation, both North Anna and Surry Power Stations intend to use a Valve Operation Test and Evaluation System (VOTES) test as a positive means of confirming that the main steam non-return check valve disks are on their seats after cessation of steam flow.

The VOTES test will be performed on each unit's three main steam non-return check valves during the cooldown process for scheduled cold shutdowns. Since this testing could delay plant cooldown, the test will not be performed during shutdowns caused by forced events. The Institute of Nuclear Power Operations program for Nuclear Power Plant Performance Indicators defines forced events as "failures or other unplanned conditions that require removing the unit from service before the end of the next weekend." A description of the VOTES test method and the basis of the test frequency is provided in Attachment 1 for North Anna Power Station, and Attachment 2 for Surry Power Station.

The NRC's Safety Evaluation Reports for Surry and North Anna granted interim relief for the non-return valves until the end of the 1993 Surry Unit 2 refueling outage provided that a nonintrusive test method was implemented during each cooldown to cold

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shutdown after that refueling outage. Due to the time required to properly revise test and operating procedures, an additional interim period is necessary before implementation of the new VOTES test method. During this additional interim period the current test method will be performed for any unit brought to cold shutdown. This test will not be performed more often than once every three months. North Anna and Surry Power Stations plan to implement the VOTES test method for each scheduled cold shutdown after September 1, 1993.

This relief request has been reviewed by the Surry and North Anna Station Nuclear Safety and Operating Committees.

If you have any questions or require additional information, please contact us.

Very truly yours,

W. L. Stewart
Senior Vice President - Nuclear

Attachments

cc: U. S. Nuclear Regulatory Commission
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Mr. M. W. Branch
NRC Senior Resident Inspector
Surry Power Station

Mr. M. S. Lesser
NRC Senior Resident Inspector
North Anna Power Station

Attachment 1

North Anna Power Station
ASME Section XI Cold Shutdown Justification

COLD SHUTDOWN JUSTIFICATION CSV-40
North Anna Unit 1

I. IDENTIFICATION OF COMPONENTS

System: Main Steam

Valve(s): 1-MS-NRV-101A
1-MS-NRV-101B
1-MS-NRV-101C

Category: C

Class: 2

Function: Main Steam Non-return Valves

II. COLD SHUTDOWN JUSTIFICATION

Valve Description

The main steam non-return valves at North Anna Power Station are located in the main steam valve house and are a globe type stop check design. The valves measure approximately 16 feet from the bottom of the valve body to the top of the hand wheel and weigh almost 24,000 lbs. The disk is welded to a hollow piston and the whole assembly is free to move about 25 vertical inches within the valve body cylinder. The disk measures 25.5 inches across and the disk and piston assembly weighs approximately 1,200 lbs. When the main steam system is not inservice, a motor operator is used to run the valve stem down onto the disk to secure the main steam line.

These valves open to allow steam to the turbine. For accident conditions, the non-return valves in conjunction with the main steam trip valves prevent the blowdown of more than one steam generator for any break location, even if one valve fails to close. For example, for a break upstream of the trip valve in one line, the closure of either the non-return valve in that line or the trip valves in the other lines prevents the blowdown of the other steam generators.

Method of Testing

The piping downstream of each non-return valve leads to a common distribution manifold and cannot be isolated. Therefore, performing a back seat test using flow is not practical. Also, valve disassembly and inspection are not practical alternatives due to the size of the valve and the weight of the disk.

However, an alternative exists to verify that the disk moved to the valve seat during reactor coolant system (RCS) cooldown. When the RCS temperature is between 350°F and 195°F during the cooldown process, the main steam trip valves are closed. Then, the main steam non-return valves close in response to the loss of steam flow.

After the main steam trip valve is closed, the Valve Operation Test and Evaluation System (VOTES) can be used to determine the position of the disk of the NRV. After the trip valve is closed, the non-return valve stem is run down onto the disk after the disk returns to the seat. A change in the running force within the normal travel of stem indicates a resistance to stem movement (e.g., a stuck disk). Verifying that the stem travels to the seated disk with nominal changes in the running force indicates that the disk is on the seat. The test requires that the cooldown process be delayed between one to two hours to setup the instrumentation and to perform the test on each of three valves. Virginia Power owns the VOTES equipment and has personnel trained to use the equipment and interpret the results.

The VOTES consists of a force sensor mounted on the valve, valve switch current probes and a motor current probe. The force sensor detects the strain experienced by the valve as the valve stem moves. Strain is converted to force. The valve switch probes determine the status of the torque and limit switches, and the open and closed bypass switches in the motor operator control circuit over the course of stem travel. To attach the switch and motor current probes, the power to the valve must be interrupted.

Frequency of Testing

Full stroke or part stroke exercising of these valves during power operation would result in a turbine and reactor trip.

Plant cooldown procedures require the trip valve to be closed, and then the non-return valve stem run down onto the disk to isolate the main steam system. The VOTES testing must be performed when the non-return valves are initially closed during the cooldown to assess the piston-disk assembly's as-found position. As indicated above, the VOTES test will delay the cooldown process from between one to two hours. Some cold shutdown outages are forced outages that result from exceeding a Technical Specification limit such as unidentified RCS leakage. The emphasis in a forced outage cooldown is to reach cold shutdown as rapidly as possible and to mitigate the cause of the forced outage. Stopping this process to perform the VOTES test would complicate the operator's task to secure the plant and may reduce plant safety. However, for scheduled cold shutdowns where there are no mitigating circumstances, there is adequate time to notify the test personnel, carry the equipment into the field and perform the test.

There is no evidence in the valve history that a valve has stuck in the open or partial open position. The piston-disk assembly is not attached to any other internal part, the 1,200 lb piston-disk assembly is maintained parallel within the valve body cylinder and the main steam system is very clean. Consequently, there is no mechanism to prevent the disk from dropping from the full-open position to the valve seat.

The VOTES test described above will be performed on each main steam non-return valve during the cooldown process for each scheduled cold shutdown. This test will not be performed more often then once every three months.

COLD SHUTDOWN JUSTIFICATION CSV-40
North Anna Unit 2

I. IDENTIFICATION OF COMPONENTS

System: Main Steam

Valve(s): 2-MS-NRV-201A
2-MS-NRV-201B
2-MS-NRV-201C

Category: C

Class: 2

Function: Main Steam Non-return Valves

II. COLD SHUTDOWN JUSTIFICATION

Valve Description

The main steam non-return valves at North Anna Power Station are located in the main steam valve house and are a globe type stop check design. The valves measure approximately 16 feet from the bottom of the valve body to the top of the hand wheel and weigh almost 24,000 lbs. The disk is welded to a hollow piston and the whole assembly is free to move about 25 vertical inches within the valve body cylinder. The disk measures 25.5 inches across and the disk and piston assembly weighs approximately 1,200 lbs. When the main steam system is not inservice, a motor operator is used to run the valve stem down onto the disk to secure the main steam line.

These valves open to allow steam to the turbine. For accident conditions, the non-return valves in conjunction with the main steam trip valves prevent the blowdown of more than one steam generator for any break location, even if one valve fails to close. For example, for a break upstream of the trip valve in one line, the closure of either the non-return valve in that line or the trip valves in the other lines prevents the blowdown of the other steam generators.

Method of Testing

The piping downstream of each non-return valve leads to a common distribution manifold and cannot be isolated. Therefore, performing a back seat test using flow is not practical. Also, valve disassembly and inspection are not practical alternatives due to the size of the valve and the weight of the disk.

However, an alternative exists to verify that the disk moved to the valve seat during reactor coolant system (RCS) cooldown. When the RCS temperature is between 350°F and 195°F during the cooldown process, the main steam trip valves are closed. Then, the main steam non-return valves close in response to the loss of steam flow.

After the main steam trip valve is closed, the Valve Operation Test and Evaluation System (VOTES) can be used to determine the position of the disk of the NRV. After the trip valve is closed, the non-return valve stem is run down onto the disk after the disk returns to the seat. A change in the running force within the normal travel of stem indicates a resistance to stem movement (e.g., a stuck disk). Verifying that the stem travels to the seated disk with nominal changes in the running force indicates that the disk is on the seat. The test requires that the cooldown process be delayed between one to two hours to setup the instrumentation and to perform the test on each of three valves. Virginia Power owns the VOTES equipment and has personnel trained to use the equipment and interpret the results.

The VOTES consists of a force sensor mounted on the valve, valve switch current probes and a motor current probe. The force sensor detects the strain experienced by the valve as the valve stem moves. Strain is converted to force. The valve switch probes determine the status of the torque and limit switches, and the open and closed bypass switches in the motor operator control circuit over the course of stem travel. To attach the switch and motor current probes, the power to the valve must be interrupted.

Frequency of Testing

Full stroke or part stroke exercising of these valves during power operation would result in a turbine and reactor trip.

Plant cooldown procedures require the trip valve to be closed, and then the non-return valve stem run down onto the disk to isolate the main steam system. The VOTES testing must be performed when the non-return valves are initially closed during the cooldown to accurately assess the piston-disk assembly's as-found position. As indicated above, the VOTES test will delay the cooldown process from between one to two hours. Some cold shutdown outages are forced outages that result from exceeding a Technical Specification limit such as unidentified RCS leakage. The emphasis in a forced outage cooldown is to reach cold shutdown as rapidly as possible and to mitigate the cause of the forced outage. Stopping this process to perform the VOTES test would complicate the operator's task to secure the plant and may reduce plant safety. However, for scheduled cold shutdowns where there are no mitigating circumstances, there is adequate time to notify the test personnel, carry the equipment into the field and perform the test.

There is no evidence in the valve history that a valve has stuck in the open or partial open position. The piston-disk assembly is not attached to any other internal part, the 1,200 lb piston-disk assembly is maintained parallel within the valve body cylinder and the main steam system is very clean. Consequently, there is no mechanism to prevent the disk from dropping from the full-open position to the valve seat.

The VOTES test described above will be performed on each main steam non-return valve during the cooldown process for each scheduled cold shutdown. This test will not be performed more often then once every three months.

Attachment 2

Surry Power Station

ASME Section XI Cold Shutdown Justification

COLD SHUTDOWN JUSTIFICATION CSV-32
Surry Unit 1

I. IDENTIFICATION OF COMPONENTS

System: Main Steam

Valve(s): 1-MS-NRV-101A
1-MS-NRV-101B
1-MS-NRV-101C

Category: C

Class: 2

Function: Main Steam Non-return Valves

II. COLD SHUTDOWN JUSTIFICATION

Valve Description

The main steam non-return valves at Surry Power Station are located in the main steam valve house and are a globe type stop check design. The valves measure approximately 16 feet from the bottom of the valve body to the top of the hand wheel and weigh almost 18,000 lbs. The disk is welded to a hollow piston and the whole assembly is free to move about 25 vertical inches within the valve body cylinder. The disk measures 25.5 inches across and the disk and piston assembly weighs approximately 1,200 lbs. When the main steam system is not inservice, a motor operator is used to run the valve stem down onto the disk to secure the main steam line.

These valves open to allow steam to the turbine. For accident conditions, the non-return valves in conjunction with the main steam trip valves prevent the blowdown of more than one steam generator for any break location, even if one valve fails to close. For example, for a break upstream of the trip valve in one line, the closure of either the non-return valve in that line or the trip valves in the other lines prevents the blowdown of the other steam generators.

Method of Testing

The piping downstream of each non-return valve leads to a common distribution manifold and cannot be isolated. Therefore, performing a back seat test using flow is not practical. Also, valve disassembly and inspection are not practical alternatives due to the size of the valve and the weight of the disk.

However, an alternative exists to verify that the disk moved to the valve seat during reactor coolant system (RCS) cooldown. When the RCS temperature is between 350°F and 195°F during the cooldown process, the main steam trip valves are closed. Then, the main steam non-return valves close in response to the loss of steam flow.

After the main steam trip valve is closed, the Valve Operation Test and Evaluation System (VOTES) can be used to determine the position of the disk of the NRV. After the trip valve is closed, the non-return valve stem is run down onto the disk after the disk returns to the seat. A change in the running force within the normal travel of stem indicates a resistance to stem movement (e.g., a stuck disk). Verifying that the stem travels to the seated disk with nominal changes in the running force indicates that the disk is on the seat. The test requires that the cooldown process be delayed between one to two hours to setup the instrumentation and to perform the test on each of three valves. Virginia Power owns the VOTES equipment and has personnel trained to use the equipment and interpret the results.

The VOTES consists of a force sensor permanently mounted on the valve yoke, valve switch current probes and a motor current probe. The force sensor detects the strain experienced by the yoke as the valve stem moves. Strain is converted to force. The valve switch probes determine the status of the torque and limit switches, and the open and closed bypass switches in the motor operator control circuit over the course of stem travel. To attach the switch and motor current probes, the power to the valve must be interrupted.

Frequency of Testing

Full stroke or part stroke exercising of these valves during power operation would result in a turbine and reactor trip.

Plant cooldown procedures require the trip valve to be closed, and then the non-return valve stem run down onto the disk to isolate the main steam system. The VOTES testing must be performed when the non-return valves are initially closed during the cooldown to accurately assess the piston-disk assembly's as-found position. As indicated above, the VOTES test will delay the cooldown process from between one to two hours. Some cold shutdown outages are forced outages that result from exceeding a Technical Specification limit such as unidentified RCS leakage. The emphasis in a forced outage cooldown is to reach cold shutdown as rapidly as possible and to mitigate the cause of the forced outage. Stopping this process to perform the VOTES test would complicate the operator's task to secure the plant and may reduce plant safety. However, for scheduled cold shutdowns where there are no mitigating circumstances, there is adequate time to notify the test personnel, carry the equipment into the field and perform the test.

There is no evidence in the valve history that a valve has stuck in the open or partial open position. The piston-disk assembly is not attached to any other internal part, the 1,200 lb piston-disk assembly is maintained parallel within the valve body cylinder and the main steam system is very clean. Consequently, there is no mechanism to prevent the disk from dropping from the full-open position to the valve seat.

The VOTES test described above will be performed on each main steam non-return valve during the cooldown process for each scheduled cold shutdown. This test will not be performed more often then once every three months.

COLD SHUTDOWN JUSTIFICATION CSV-32
Surry Unit 2

I. IDENTIFICATION OF COMPONENTS

System: Main Steam

Valve(s): 2-MS-NRV-201A
2-MS-NRV-201B
2-MS-NRV-201C

Category: C

Class: 2

Function: Main Steam Non-return Valves

II. COLD SHUTDOWN JUSTIFICATION

Valve Description

The main steam non-return valves at Surry Power Station are located in the main steam valve house and are a globe type stop check design. The valves measure approximately 16 feet from the bottom of the valve body to the top of the hand wheel and weigh almost 18,000 lbs. The disk is welded to a hollow piston and the whole assembly is free to move about 25 vertical inches within the valve body cylinder. The disk measures 25.5 inches across and the disk and piston assembly weighs approximately 1,200 lbs. When the main steam system is not inservice, a motor operator is used to run the valve stem down onto the disk to secure the main steam line.

These valves open to allow steam to the turbine. For accident conditions, the non-return valves in conjunction with the main steam trip valves prevent the blowdown of more than one steam generator for any break location, even if one valve fails to close. For example, for a break upstream of the trip valve in one line, the closure of either the non-return valve in that line or the trip valves in the other lines prevents the blowdown of the other steam generators.

Method of Testing

The piping downstream of each non-return valve leads to a common distribution manifold and cannot be isolated. Therefore, performing a back seat test using flow is not practical. Also, valve disassembly and inspection are not practical alternatives due to the size of the valve and the weight of the disk.

However, an alternative exists to verify that the disk moved to the valve seat during reactor coolant system (RCS) cooldown. When the RCS temperature is between 350°F and 195°F during the cooldown process, the main steam trip valves are closed. Then, the main steam non-return valves close in response to the loss of steam flow.

After the main steam trip valve is closed, the Valve Operation Test and Evaluation System (VOTES) can be used to determine the position of the disk of the NRV. After the trip valve is closed, the non-return valve stem is run down onto the disk after the disk returns to the seat. A change in the running force within the normal travel of stem indicates a resistance to stem movement (e.g., a stuck disk). Verifying that the stem travels to the seated disk with nominal changes in the running force indicates that the disk is on the seat. The test requires that the cooldown process be delayed between one to two hours to setup the instrumentation and to perform the test on each of three valves. Virginia Power owns the VOTES equipment and has personnel trained to use the equipment and interpret the results.

The VOTES consists of a force sensor permanently mounted on the valve yoke, valve switch current probes and a motor current probe. The force sensor detects the strain experienced by the yoke as the valve stem moves. Strain is converted to force. The valve switch probes determine the status of the torque and limit switches, and the open and closed bypass switches in the motor operator control circuit over the course of stem travel. To attach the switch and motor current probes, the power to the valve must be interrupted.

Frequency of Testing

Full stroke or part stroke exercising of these valves during power operation would result in a turbine and reactor trip.

Plant cooldown procedures require the trip valve to be closed, and then the non-return valve stem run down onto the disk to isolate the main steam system. The VOTES testing must be performed when the non-return valves are initially closed during the cooldown to accurately assess the piston-disk assembly's as-found position. As indicated above, the VOTES test will delay the cooldown process from between one to two hours. Some cold shutdown outages are forced outages that result from exceeding a Technical Specification limit such as unidentified RCS leakage. The emphasis in a forced outage cooldown is to reach cold shutdown as rapidly as possible and to mitigate the cause of the forced outage. Stopping this process to perform the VOTES test would complicate the operator's task to secure the plant and may reduce plant safety. However, for scheduled cold shutdowns where there are no mitigating circumstances, there is adequate time to notify the test personnel, carry the equipment into the field and perform the test.

There is no evidence in the valve history that a valve has stuck in the open or partial open position. The piston-disk assembly is not attached to any other internal part, the 1,200 lb piston-disk assembly is maintained parallel within the valve body cylinder and the main steam system is very clean. Consequently, there is no mechanism to prevent the disk from dropping from the full-open position to the valve seat.

The VOTES test described above will be performed on each main steam non-return valve during the cooldown process for each scheduled cold shutdown. This test will not be performed more often then once every three months.