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March 31, 2004
PY-CEI/NRR-2767L

United States Nuclear Regulatory Commission
Document Control Desk
Washington, DC 20555

Perry Nuclear Power Plant
Docket No. 50-440
License Amendment Request Pursuant to 10 CFR 50.90 and Relief Request Pursuant to 10 CFR 50.55a(a)(3) Related to the Testing of Safety/Relief Valves

Ladies and Gentlemen:

Nuclear Regulatory Commission (NRC) review and approval of a proposed License Amendment Request (LAR) is requested for the Perry Nuclear Power Plant (PNPP). In addition, a related Relief Request is included regarding American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code requirements.

The proposed LAR will eliminate the Technical Specification Surveillance Requirements (SRs) that require each Main Steam Safety/Relief Valve to open during the manual actuation portion of testing the valves. In accordance with 10 CFR 50.55a, "Codes and Standards," paragraph (a)(3), this submittal includes Relief Request VR-13. VR-13 is a request for relief from the requirements of ASME/American National Standards Institute (ANSI) Operation and Maintenance (OM) of Nuclear Power Plants, OM-1995, Appendix I, Section 3.4.1(d) that after installation, the Safety Relief/Valves are manually opened and closed.

Approval of the proposed LAR and associated relief request is desired to support the next scheduled refueling outage. Therefore, to support this activity, it is requested that the proposed LAR and Relief Request be approved no later than January 1, 2005. There are no commitments contained in this letter or its attachments. If you have questions or require additional information, please contact Mr. Vernon K. Higaki, Manager – Regulatory Affairs, at (440) 280-5294.

Very truly yours,

Attachments:

1. Notarized Affidavit
2. An evaluation of the change, including a Summary, Description of the Proposed Change, Background, Technical Analysis, Conclusion, and Environmental Consideration
3. Safety Relief Valve Figure and Simple Schematic of Control Air for SRV ADS
4. Significant Hazards Consideration
5. Proposed Technical Specification Change (mark-up)
6. Proposed Technical Specification Bases Change (mark-up for information only)
7. Relief Request VR-13

cc: NRC Project Manager
NRC Resident Inspector
NRC Region III
State of Ohio

A001

I, William R. Kanda, hereby affirm that (1) I am Vice President - Perry, of the FirstEnergy Nuclear Operating Company, (2) I am duly authorized to execute and file this certification as the duly authorized agent for The Cleveland Electric Illuminating Company, Toledo Edison Company, Ohio Edison Company, and Pennsylvania Power Company, and (3) the statements set forth herein are true and correct to the best of my knowledge, information and belief.

William R. Kanda

Subscribed to and affirmed before me, the 31st day of March, 2004

Notary Public
My commission expires 8-15-06

SUMMARY

Nuclear Regulatory Commission review and approval is requested of a License Amendment Request (LAR) to the Perry Nuclear Power Plant (PNPP) Technical Specifications (TS) to provide alternate means for testing the Main Steam Safety/Relief Valves (S/RVs), including those valves that provide the Automatic Depressurization System (ADS) and the Low-Low Set (LLS) valve functions. The proposed LAR will modify Technical Specification (TS) Surveillance Requirement (SR) 3.4.4.3, SR 3.5.1.7 and SR 3.6.1.6.1 to eliminate the requirement that each S/RV opens during the manual actuation of the S/RVs.

Industry experience has shown that the current required TS SR testing method increases the risk for S/RV through-seat leakage during power operation. The alternate testing proposed by this LAR reduces this risk by eliminating unnecessary valve stroking after performing the required American Society of Mechanical Engineers (ASME) Code for Operations and Maintenance setpoint testing.

DESCRIPTION OF THE PROPOSED CHANGE

The proposed changes to TS SR 3.4.4.3, SR 3.5.1.7 and SR 3.6.1.6.1 remove the requirement for the S/RV disks to be lifted from their seats when manually actuated. The SR will specifiy that the actuator is to stroke when manually actuated.

With the proposed LAR, TS SR 3.4.4.3 will state: *"Verify each required S/RV actuator strokes when manually actuated."*

With the proposed LAR, TS SR 3.5.1.7 will state: *"Verify each required ADS valve actuator strokes when manually actuated."*

With the proposed LAR, TS SR 3.6.1.6.1 will state: *"Verify each LLS valve actuator strokes when manually actuated."*

Each of the TS SRs above currently include the same Note that states: *"Not required to be performed until 12 hours after reactor steam pressure and flow are adequate to perform the test."* No change to this note is proposed.

BACKGROUND

The PNPP has 19 Dikkers S/RVs that are exercised every refueling outage with approximately 950 psi in the Reactor Pressure Vessel (RPV) using two redundant divisional solenoid valves. The S/RVs are installed to protect the RPV from overpressurization during upset conditions. The size and number of S/RVs are selected such that peak pressure within the nuclear steam system will not exceed ASME Boiler and Pressure Vessel Code stress limits.

The S/RVs are direct-acting, spring-loaded, safety valves with attached pneumatic actuators that are designed to perform as either a safety valve or as a relief valve (reference Attachment 3 for figures of the S/RV). The safety mode of operation is independent and separate from the relief mode. The safety mode of operation is initiated when the force produced from the increasing inlet steam pressure overcomes the opposing spring

disk/stem weight and frictional forces to move the disk in the opening direction. The relief mode of operation is initiated when an electrical signal is received by one of two solenoid valves located on the pneumatic relief-mode actuator assembly. The manual action of the S/RVs is initiated from the Control Room. The solenoid and air-control valve will open to allow an air source to pressurize the lower side of the piston in the pneumatic cylinder to push it upwards. This action is transmitted through a lever arm and pivot mechanism which in turn lifts the valve stem/disk, thereby opening the valve to allow steam to discharge through the valve. Upon de-energizing the solenoid, the air valve will reposition to allow the pressurized air in the cylinder to vent to the atmosphere, thus closing the valve.

Eight of the 19 S/RVs fulfill the ADS function. The ADS function provides depressurization of the RPV during a small break Loss Of Coolant Accident (LOCA) if the High Pressure Core Spray System (HPCS) fails or is unable to maintain required water level in the RPV. The S/RVs equipped for the ADS function will depressurize the RPV to allow the combination of the Low Pressure Coolant Injection (LPCI) system and Low Pressure Core Spray (LPCS) system to inject into the RPV. The ADS valves can be opened automatically or manually. TS SR 3.5.1.7 verifies that the ADS valves can be manually opened. The frequency of TS SR 3.5.1.7 requires the testing to be performed on a staggered basis to ensure that each valve solenoid is alternately tested.

Six of the 19 S/RVs are equipped for the Low Low Set (LLS) function. To assure that no more than one relief valve reopens following a reactor isolation event, two S/RVs are provided with lower opening and closing pressure setpoints and four valves are provided with lower closing setpoints. The lower pressure setpoint causes all the LLS valves to stay open longer, such that reopening of more than one S/RV is prevented on subsequent actuations. Therefore, the LLS function prevents excessive short duration S/RV cycles with valve actuation at the relief setpoint. TS SR 3.6.1.6.1 verifies that the LLS valves can be manually opened. The frequency of TS SR 3.6.1.6.1 requires the testing to be performed on a staggered basis to ensure that each valve solenoid is alternately tested.

TS SR 3.4.4.3 verifies that the S/RVs can be manually opened. The frequency of TS SR 3.4.4.3 requires the testing to be performed on a staggered basis to ensure that each valve solenoid is alternatively tested.

The Note associated with each of the referenced TS SRs ensures that adequate reactor steam pressure is available to perform the manual actuation test (with actuator coupled to valve stem) to avoid damaging the valve. Also, adequate steam flow must be passing through the main turbine or turbine bypass valves to continue to control reactor pressure when the S/RVs divert steam flow upon opening. Therefore, this Note allows sufficient time after the required pressure and flow are achieved to perform this test. The proposed LAR will not change this Note to allow the option to test the S/RVs via manual actuation from the Control Room with the actuator coupled to valve stem during power operation.

Currently during each PNPP refueling outage, a minimum of 9 S/RVs shall be tested with all (19) S/RVs tested within a 5-year interval. The S/RVs removed from the plant are tested for lift setpoint and seat leakage at a qualified testing facility. Following refurbishment and re-certification testing of these S/RVs, the test facility tests full operation of the S/RVs, including solenoid valve, air block valve, actuator, and relief valve stem/disk. Upon their return from the test facility and re-installation, all 19 S/Rvs are full stroke exercised in

accordance with TS SR 3.4.4.3, SR 3.5.1.7 and SR 3.6.1.6.1 to satisfy the requirements of American Society and Mechanical Engineers (ASME)/(ANSI) American National Standards Institute Operation and Maintenance (OM) of Nuclear Power Plants, Section 3.4.1(d), Appendix I.

ASME/ANSI OM Code Appendix I has evolved over the past decade such that it is now a Code (ASME OM Code -1995 Appendix I), as opposed to a Standard (ASME/ANSI OM Part 1 – 1987), and now provides guidance on establishing acceptance criteria, grouping of valves, and additional testing. PNPP Relief Request VR-6 approved per NRC Safety Evaluation dated April 5, 1993 (TAC No. M74784), approved the use of ASME OM Code, 1995 Edition for the performance of inservice testing of pressure relief devices versus OM Code, 1987 Edition, 1988 Addenda.

TECHNICAL ANALYSIS

The current testing requirement of opening the S/RVs during power operation can result in additional seat leakage or in a stuck open S/RV during power operation. Uncontrolled steam discharge from the S/RVs would be directed to the Containment suppression pool, which requires increased operation of the Residual Heat Removal (RHR) system in the suppression pool cooling mode, thereby increasing the unavailability/inoperability time of the RHR system. The RHR system must be periodically re-aligned from its normal safety mode of vessel injection to provide suppression pool cooling. Additional operation of the RHR system to cool the suppression pool due to leaking S/RVs generates additional wear and cycling of system components. A stuck open S/RV also could force a plant shutdown to repair or replace the valve.

In addition, cycling of the S/RVs during power operation significantly increases the risk of creating undesired seat leakage and/or escalating deterioration of valve seating surfaces due to such leakage.

The proposed LAR will allow testing of the S/RVs to be performed in two separate stages. The first stage will consist of manual actuation of the valves at the qualified test facility. This will verify the open and close function of the valve with the actuator coupled to the valve stem, and includes both solenoids and the air block valve. Each solenoid is energized, one at a time, resulting in two separate lifts of the SRV disk from the seat. The second stage will consist of manual actuation of the S/RVs actuators following installation into the plant with the actuator uncoupled from the valve stem.

The proposed test alternative provides for actual stroking of the S/RV disks after performing the Code required setpoint testing, combined with the stroking of all 19 S/RV actuators after the population of removed S/RVs have been re-installed. The proposed test alternative provides for stroke testing of the S/RVs at the same frequency as required by OM-1995, Appendix I, and provides for stroke testing of the S/RV actuators, once installed, to assure proper operation.

The proposed test alternative provides verification of proper control connections by requiring the pneumatic and electrical controls to cycle the actuator on each S/RV following installation, without stroking the S/RV itself. The plant installed testing will verify full operation of the electrical circuitry, manual actuation solenoid valve, block valve, and the

actuator. In addition, the test population of S/RVs removed each refuel outage for setpoint testing would also be tested in the relief mode. This setpoint testing provides assurance that the S/RV would perform as expected when control air pressure is applied to the actuator assembly. Therefore, the proposed test alternative continues to demonstrate full functionality of the S/RVs while minimizing the potential for creating valve seat leakage caused by cycling the valve unnecessarily.

Nuclear industry experience has shown that repeated manual actuation of the S/RVs and ADS valves can lead to valve through seat leakage during plant operation. This experience is substantiated within NUREG-1482, "Guidelines for Inservice Testing at Nuclear Power Plants", and NUREG-0626, " Generic Evaluation of Feedwater Transients and Small Break Loss-of-Coolant Accidents in GE-Designed Operating Plants and Near Term Operating License Applications", which recommend reducing the number of challenges to the ADS valves.

A difference between the current TS testing and that proposed by this LAR is that since the S/RVs will no longer be stroke tested to discharge steam flow, the S/RV discharge lines would not be verified to be unblocked by steam flow. Existing Foreign Material Exclusion (FME) program controls require covers be placed on all system openings when each S/RV is removed. The FME controls applicable to the S/RVs are the same that exists for the reactor vessel and its support systems. Also, the horizontal orientation of the S/RV piping discharge lines minimizes the potential for unwanted materials from entering into the lines. Therefore, the controls provided by the existing FME program along with the horizontal orientation of the pipelines provides reasonable assurance that the discharge lines will remain unblocked by foreign material. As part of the implementation of the proposed LAR, a discussion of the need for implementing effective FME controls applicable to the S/RVs will be added to the TS Bases (Attachment 6). It is also recognized that there is the potential for valve/component damage upon re-installation of the actuator after it has been uncoupled from the valve. However, this potential is considered small considering this task is completed by qualified maintenance personnel that re-install the actuator per the test facility configuration using normal work control processes, such as approved procedures, mock-up training and pre-job briefs.

After each S/RV has been removed for testing, a re-certified valve is transported to the Drywell and placed in the appropriate Main Steam line. Pursuant to the valve manufacturer's recommendations, the valves are stored and transported in the vertical position at all times, with the exception of transportation within the Containment and Drywell for re-installation. The valve is horizontally oriented for short periods when hoisted and moved through locations in the Containment and Drywell. The lifting and rigging of the valves during transport and re-installation are accomplished by qualified maintenance personnel. Also, the components most susceptible to damage during storage and transport are the relief mode components, which per the proposed LAR will be adequately tested prior to plant start-up. The safety mode components are encased entirely within the S/RV bonnet, and the exposed stem of the relief actuator attachment is protected by the S/RV bonnet and lifting attachments. In the plant's operating history, the PNPP has both removed and installed all 19 S/RVs with no occurrences of S/RV damage.

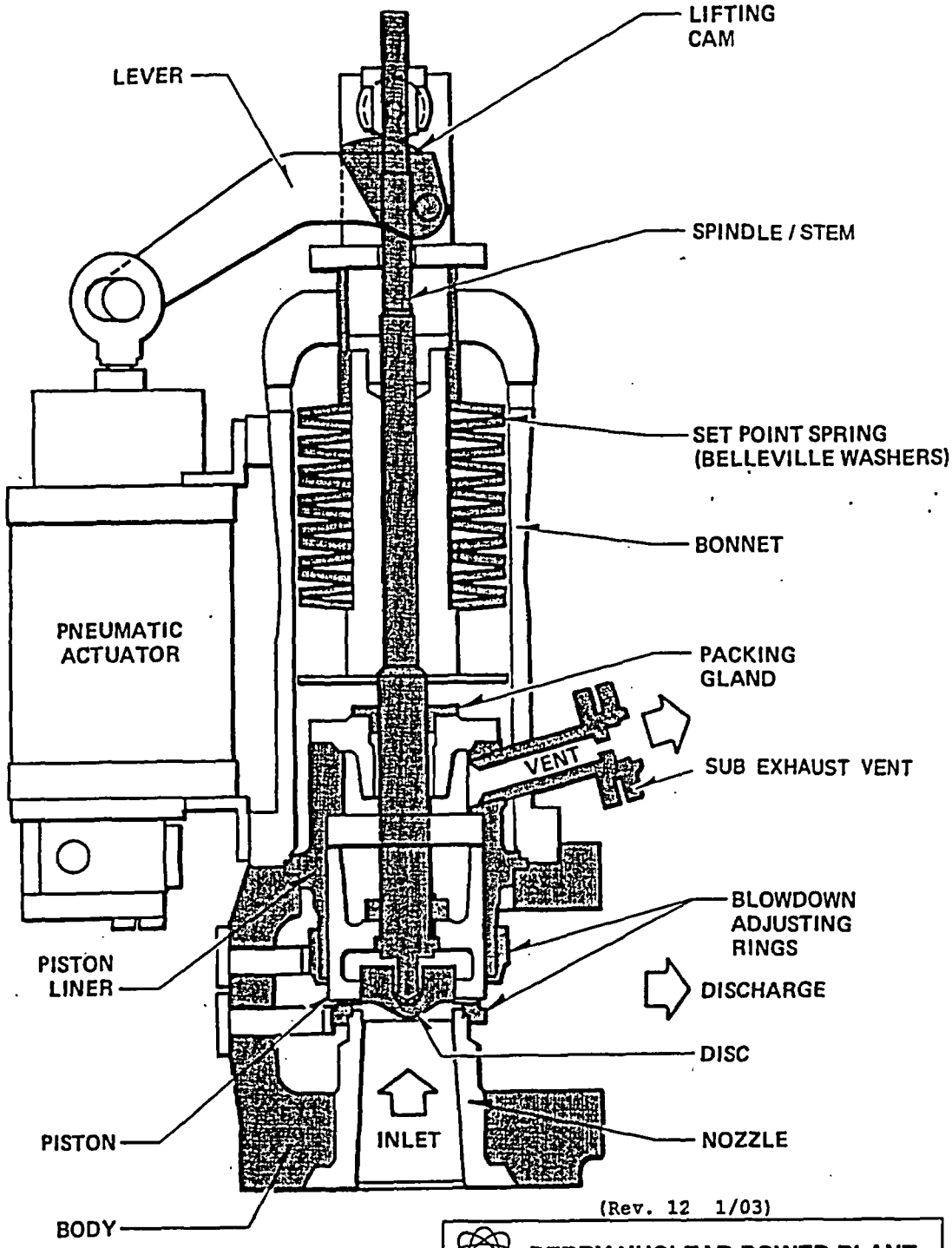
The NRC has found the proposed S/RV testing alternative acceptable per their review and approval of similar LARs/Relief Requests, such as for the Clinton Power Station, Unit 1 (TAC No. MB2256) and the River Bend Station, Unit 1 (TAC No. MB5138).

CONCLUSION

Specific PNPP experience in addition to industry experience has shown that the current required TS SR testing method increases the risk for S/RV through-seat leakage during power operation. The alternate testing proposed by this LAR will allow surveillance of the relief mode of operation of the S/RVs to be performed without physically lifting the valve disk off its seat at power. The proposed test alternative will reduce the risk of seat leakage by eliminating unnecessary valve stroking after performing the required Code setpoint testing. The test alternative continues to ensure that components associated with the S/RVs are adequately tested and therefore provides reasonable assurance that the PNPP S/RVs will perform their intended safety function.

ENVIRONMENTAL CONSIDERATION

The proposed Technical Specification change request was evaluated against the criteria of 10 CFR 51.22 for environmental considerations. The proposed change does not significantly increase individual or cumulative occupational radiation exposures, does not significantly change the types or significantly increase the amounts of effluents that may be released off-site and, as discussed in Attachment 4, does not involve a significant hazards consideration. Based on the foregoing, it has been concluded that the proposed Technical Specification change meets the criteria given in 10 CFR 51.22(c)(9) for categorical exclusion from the requirement for an Environmental Impact Statement.



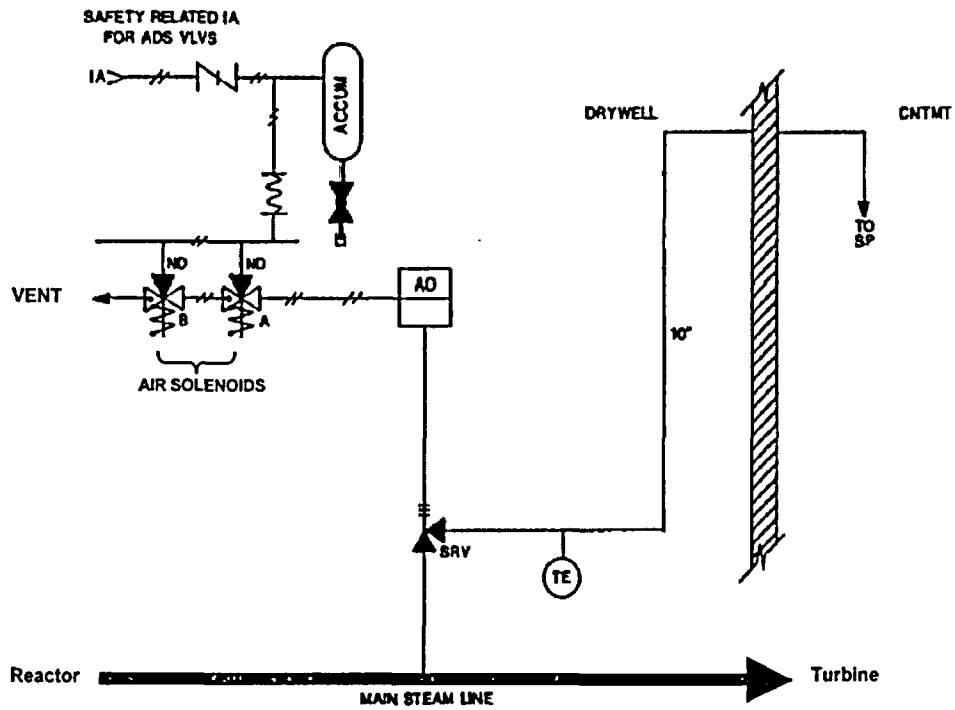
(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Schematic of Safety Valve with Auxiliary Activating Device

USAR FIGURE 5.2-12

Simplified Schematic of Control Air
For
Safety Relief Valve (SRV)
Automatic Depressurization System (ADS)



SIGNIFICANT HAZARDS CONSIDERATION

The standards used to arrive at a determination that a request for amendment involves no significant hazards considerations are included in the Nuclear Regulatory Commission's Regulation, 10 CFR 50.92, which states that the operation of the facility in accordance with the proposed amendment would not: (1) involve a significant increase in the probability or consequences of an accident previously evaluated; or (2) create the possibility of a new or different kind of accident from any previously evaluated; or (3) involve a significant reduction in a margin of safety.

Nuclear Regulatory Commission review and approval is requested of a License Amendment Request (LAR) to the Perry Nuclear Power Plant (PNPP) Technical Specifications to provide alternate means for testing the Main Steam Safety/Relief Valves (S/RVs), including those valves that provide the Automatic Depressurization System (ADS) and the Low-Low Set (LLS) valve functions. The proposed LAR will modify Technical Specification (TS) Surveillance Requirement TS SR 3.4.4.3, SR 3.5.1.7 and SR 3.6.1.6.1 to eliminate the requirement that each S/RV opens during the manual actuation testing of the S/RVs.

The proposed amendment has been reviewed with respect to these three factors and it has been determined that the proposed change does not involve a significant hazard because:

1. The proposed change does not involve a significant increase in the probability or consequences of an accident previously evaluated.

   The proposed LAR modifies TS SR 3.4.4.3, SR 3.5.1.7 and SR 3.6.1.6.1 to allow the uncoupling of the S/RV stem from the S/RV actuator during manual actuation. The proposed LAR does not change the manner in which the S/RVs are intended to operate.

   The performance of S/RV testing provides assurance that the S/RVs are capable of depressurizing the Reactor Pressure Vessel (RPV). This will protect the RPV from overpressurization and allows the combination of the Low Pressure Coolant Injection (LPCI) system and Low Pressure Core Spray (LPCS) system to inject into the RPV as designed. The proposed testing requirements are sufficient to provide confidence that the S/RVs, ADS valves and the LLS valves will perform their intended design safety functions.

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

2. The proposed change would not create the possibility of a new or different kind of accident from any previously evaluated.

   The proposed LAR changes TS SR 3.4.4.3, SR 3.5.1.7 and SR 3.6.1.6.1. The changes to these SRs do not effect the assumed accident performance of the S/RVs, nor any plant structure, system or component previously evaluated. The LAR does not install any new equipment, nor does it cause existing equipment to be operated in a new or different manner. The S/RVs continue to be bench-tested to verify the safety and relief modes of valve operation. The changes will allow the testing of the manual actuation electrical circuitry, solenoid and air control valve, and the actuator without causing the S/RV to open. No setpoints are being changed which would alter the dynamic response of plant equipment.

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

3. The proposed change will not involve a significant reduction in the margin of safety.

   The proposed LAR will allow the uncoupling of the S/RV stem from the other components associated with the manual actuation testing of the S/RVs. The proposed changes will allow the testing of the manual actuation electrical circuitry, solenoid and air control valve, and the actuator without causing the S/RV to open. The S/RVs will continue to be manually actuated by the bench-test of the valve control system and setpoint testing program prior to installation in the plant. The changes do not effect the valve setpoint or operational criteria that directs the S/RVs to be manually opened during plant transients. There are no changes which alter the setpoints at which protective actions are initiated.

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

MARKED-UP

TECHNICAL SPECIFICATION PAGES

REFLECTING THE PROPOSED AMENDMENT

SURVEILLANCE REQUIREMENTS (continued)

	SURVEILLANCE	FREQUENCY
SR 3.4.4.2	----------NOTE---------- Valve actuation may be excluded. ---------- Verify each required relief function S/RV actuates on an actual or simulated automatic initiation signal.	24 months
SR 3.4.4.3	----------NOTE---------- Not required to be performed until 12 hours after reactor steam pressure and flow are adequate to perform the test. ---------- Verify each required S/RV ~~opens~~ actuator strokes when manually actuated.	24 months on a STAGGERED TEST BASIS for each valve solenoid

SURVEILLANCE REQUIREMENTS (continued)

	SURVEILLANCE	FREQUENCY
SR 3.5.1.5	----------NOTE---------- Vessel injection/spray may be excluded. ---------- Verify each ECCS injection/spray subsystem actuates on an actual or simulated automatic initiation signal.	24 months
SR 3.5.1.6	----------NOTE---------- Valve actuation may be excluded. ---------- Verify the ADS actuates on an actual or simulated automatic initiation signal.	24 months
SR 3.5.1.7	----------NOTE---------- Not required to be performed until 12 hours after reactor steam pressure and flow are adequate to perform the test. ---------- Verify each ADS valve ~~opens~~ when manually actuated. actuator strokes	24 months on a STAGGERED TEST BASIS for each valve solenoid
SR 3.5.1.8	----------NOTE---------- ECCS actuation instrumentation is excluded. ---------- Verify the ECCS RESPONSE TIME for each ECCS injection/spray subsystem is within limits.	24 months

SURVEILLANCE REQUIREMENTS

	SURVEILLANCE	FREQUENCY
SR 3.6.1.6.1	----------NOTE---------- Not required to be performed until 12 hours after reactor steam pressure and flow are adequate to perform the test. ---------- Verify each LLS valve ~~opens~~ when manually actuated. actuator strokes	24 months on a STAGGERED TEST BASIS for each valve solenoid
SR 3.6.1.6.2	----------NOTE---------- Valve actuation may be excluded. ---------- Verify the LLS function of the six safety/relief valves actuates on an actual or *simulated automatic initiation* signal.	24 months

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TECHNICAL SPECIFICATION BASES PAGES

REFLECTING THE PROPOSED AMENDMENT

(For Information Only)

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.4.4.3

~~A manual actuation of each required S/RV is performed to verify that the valve is functioning properly and that no blockage exists in the valve discharge line. This can be demonstrated by the response of the turbine control valves or bypass valves, by a change in the measured steam flow, by the S/RV discharge pipe pressure switch, or any other method suitable to verify steam flow (e.g., tailpipe temperature.)~~

A manual actuation of each required S/RV is performed to test that the valve is functioning properly. This SR can be demonstrated by one of two methods, which are described below. If performed by Method 1, plant startup is allowed prior to performing this test because valve OPERABILITY and the setpoints for overpressure protection are verified, per ASME requirements (Ref. 5), prior to valve installation. Therefore, this SR is modified by a Note that states the Surveillance is not required to be performed until 12 hours after reactor steam pressure and flow are adequate to perform the test. The 12 hours allowed for manual actuation after the required pressure is reached is sufficient to achieve stable conditions for testing and provides a reasonable time to complete the SR. If performed by Method 2, valve OPERABILITY has been demonstrated for all installed S/RVs based upon successful offsite testing.

Method 1:

Manual actuation of the S/RV with verification of the response of the turbine control valves or bypass valves, by a change in the measured steam flow, or any other method suitable to verify steam flow (e.g., tailpipe temperature or acoustic monitoring). Adequate reactor steam pressure must be available to perform this test to avoid damaging the valve. Also, adequate flow must be passing through the main turbine or turbine bypass valves to continue to control reactor pressure when the S/RVs divert steam flow upon opening. Sufficient time is therefore allowed after the required pressure and flow is achieved to perform this test. Adequate pressure at which this test is to be performed is consistent with the pressure recommended by the valve manufacturer.

Method 2:

The required population of S/RVs tested to satisfy SR 3.4.4.1 will be stroked in the relief mode during "as found" testing at a qualified offsite facility to verify proper operation of the S/RV.

(continued)

BASES

SURVEILLANCE REQUIREMENTS

SR 3.4.4.3 (Continued)

The successful performance of the S/RVs tested provides reasonable assurance that the remaining installed S/RVs will perform in a similar fashion. After the S/RVs are replaced, the relief-mode actuator of all 19 S/RVs will be uncoupled from the S/RV stem, and cycled to ensure proper operation of the control circuit and actuator. Following cycling, the relief-mode actuator is recoupled and the proper positioning of the stem nut is independently verified. This verifies that each S/RV will properly perform its intended function.

When removing and replacing the S/RVs, Foreign Material Exclusion controls will be in place to minimize the potential for unwanted materials from entering into any S/RV opening or the piping discharge lines.

~~Adequate reactor steam pressure must be available to perform this test to avoid damaging the valve. Also, adequate steam flow must be passing through the main turbine or turbine bypass valves to continue to control reactor pressure when the S/RVs divert steam flow upon opening. Sufficient time is therefore allowed after the required pressure and flow are achieved to perform this test. Adequate pressure at which this test is to be performed is the pressure recommended by the valve manufacturer. Plant startup is allowed prior to performing this test because valve OPERABILITY and the setpoints for overpressure protection are verified, per ASME requirements, prior to valve installation. Therefore, this SR is modified by a Note that states the Surveillance is not required to be performed until 12 hours after reactor steam pressure and flow are adequate to perform the test. The 12 hours allowed for manual actuation after the required pressure and flow are reached is sufficient to achieve stable conditions for testing and provides a reasonable time to complete the SR.~~

SR 3.4.4.2 and the LOGIC SYSTEM FUNCTIONAL TEST performed in SR 3.3.6.4.4 overlap this surveillance to provide complete testing of the assumed safety function. If the valve fails to actuate due only to the failure of the solenoid but is capable of opening on overpressure, the safety function of the S/RV is considered OPERABLE.

The 24 months on a STAGGERED TEST BASIS Frequency ensures that each solenoid for each S/RV is alternately tested. The 24 month Frequency was developed based on the S/RV tests required by the ASME Boiler and Pressure Vessel Code, Section XI (Ref. 1). The 24 month Frequency is based on operating experience, and is consistent with a typical industry refueling cycle.

REFERENCES

1. ASME, Boiler and Pressure Vessel Code, Sections III and XI.
2. USAR, Chapter 15, Appendix 15B.
3. USAR, Section 15.
4. NRC Safety Evaluation to NEDC-31753P, March 8, 1993.
5. ASME/ANSI OM-1995, Appendix I, Operations and Maintenance of Nuclear Power Plants, Part 1

BASES

SURVEILLANCE REQUIREMENTS

SR 3.5.1.5 (continued)

This SR is modified by a Note that excludes vessel injection/spray during the Surveillance. Since all active components are testable and full flow can be demonstrated by recirculation through the full flow test line, coolant injection into the RPV is not required during the Surveillance.

SR 3.5.1.6

The ADS designated S/RVs are required to actuate automatically upon receipt of specific initiation signals. A system functional test is performed to verify that the mechanical portions (i.e., solenoids) of the ADS function operate as designed when initiated either by an actual or simulated initiation signal. SR 3.5.1.7 and the LOGIC SYSTEM FUNCTIONAL TEST performed in SR 3.3.5.1.6 overlap this Surveillance to provide complete testing of the assumed safety function.

The 24 month Frequency is based on the need to perform this Surveillance under the conditions that apply during a plant outage and the potential for an unplanned transient if the Surveillance were performed with the reactor at power. The 24 month Frequency is based on operating experience, and is consistent with a typical industry refueling cycle.

This SR is modified by a Note that excludes valve actuation. This prevents an RPV pressure blowdown.

SR 3.5.1.7

~~A manual actuation of each ADS valve is performed to verify that the valve and solenoids are functioning properly and that no blockage exists in the S/RV discharge lines. This is demonstrated by the response of the turbine control or bypass valve, by a change in the measured steam flow, the S/RV discharge pressure switch, or by any other method suitable to verify steam flow (e.g., tailpipe temperature). Adequate reactor steam pressure (i.e., greater than or equal to 100 psig) must be available to perform this test to avoid damaging the valve. Also, adequate steam flow must be~~

(continued)

BASES

SURVEILLANCE REQUIREMENTS

SR 3.5.1.7 (continued)

~~passing through the main turbine or turbine bypass valves to continue to control reactor pressure when the ADS valves divert steam flow upon opening. Sufficient time is therefore allowed, after the required pressure and flow are achieved, to perform this test. Adequate pressure at which this test is to be performed is consistent with the pressure recommended by the valve manufacturer. Reactor startup is allowed prior to performing this test because valve OPERABILITY and the setpoints for overpressure protection are verified, per ASME requirements, prior to valve installation. Therefore, this SR is modified by a Note that states the Surveillance is not required to be performed until 12 hours after reactor steam pressure and flow are adequate to perform the test. The 12 hours allowed for manual activation after the required pressure and flow are reached is sufficient to achieve stable conditions for testing and provides a reasonable time to complete the SR. SR 3.5.1.6 and the *LOGIC SYSTEM FUNCTIONAL TEST* performed in SR 3.3.5.1.6 overlap this Surveillance to provide complete testing of the assumed safety function.~~

A manual actuation of each required ADS valve is performed to test that the valve is functioning properly. This SR can be demonstrated by one of two methods, which are described below. If performed by Method 1, plant startup is allowed prior to performing this test because valve OPERABILITY and the setpoints for overpressure protection are verified, per ASME requirements (Ref. 17), prior to valve installation. Therefore, this SR is modified by a Note that states the Surveillance is not required to be performed until 12 hours after reactor steam pressure and flow are adequate to perform the test. The 12 hours allowed for manual actuation after the required pressure is reached is sufficient to achieve stable conditions for testing and provides a reasonable time to complete the SR. If performed by Method 2, valve OPERABILITY has been demonstrated for all installed ADS valves based upon the successful operation of the S/RVs.

Method 1:

Manual actuation of the ADS valve with verification of the response of the turbine control valves or bypass valves, by a change in the measured steam flow, or any other method suitable to verify steam flow (e.g., tailpipe temperature or acoustic monitoring). Adequate

(continued)

BASES

SURVEILLANCE REQUIREMENTS

SR 3.5.1.7 (continued)

reactor steam pressure must be available to perform this test to avoid damaging the valve. Also, adequate flow must be passing through the main turbine or turbine bypass valves to continue to control reactor pressure when the ADS valves divert steam flow upon opening. Sufficient time is therefore allowed after the required pressure and flow is achieved to perform this test. Adequate pressure at which this test is to be performed is consistent with the pressure recommended by the valve manufacturer.

Method 2:

The required population of ADS S/RVs tested to satisfy SR 3.4.4.1 will be stroked in the relief mode during "as found" testing at a qualified offsite facility to verify proper operation of the S/RV. The successful performance of the S/RVs tested provides reasonable assurance that the remaining installed S/RVs will perform in a similar fashion. After the S/RVs are replaced, the relief-mode actuator of all 19 S/RVs will be uncoupled from the S/RV stem, and cycled to ensure proper operation of the control circuit and actuator. Following cycling, the relief-mode actuator is recoupled and the proper positioning of the stem nut is independently verified. This verifies that each S/RV will properly perform its intended function. If the valve actuator fails to operate due only to the failure of the solenoid but is capable of opening the valve on overpressure, the safety function of the S/RV is considered OPERABLE.

When removing and replacing the S/RVs, Foreign Material Exclusion controls will be in place to minimize the potential for unwanted materials from entering into any S/RV opening or the piping discharge lines.

SR 3.5.1.6 and the LOGIC SYSTEM FUNCTIONAL TEST performed in LCO 3.3.5.1.6 overlap this Surveillance to provide complete testing of the safety function. The Frequency of 24 months on a STAGGERED TEST BASIS Frequency ensures that both solenoids for each ADS valve relief-mode actuator are alternately tested. The Frequency of the required-relief-mode actuator testing is based on the tests required by ASME OM, Part 1, (Ref. 17) as implemented by the Inservice Testing Program of Specification 5.5.6. The testing Frequency required by the Inservice Testing Program is based on operating experience and valve performance. Therefore, the Frequency was concluded to be acceptable from a reliability standpoint.

~~The Frequency of 24 months on a STAGGERED TEST BASIS ensures that the solenoids for each ADS valve are alternately tested. The 24 month Frequency was developed based on the S/RV tests required by the ASME Boiler and Pressure Vessel Code, Section XI (Ref. 14). The 24 month Frequency is based on operating experience, and is consistent with a typical industry refueling cycle.~~

(continued)

BASES (Continued)

SURVEILLANCE REQUIREMENTS

SR 3.5.1.8

This SR ensures that the ECCS RESPONSE TIMES are within limits for each of the ECCS injection and spray subsystems. This SR is modified by a note, which identifies that the associated ECCS actuation instrumentation is not required to be response time tested. Response time testing of the remaining subsystem components is required. This is supported by Reference 15. Response time testing acceptance criteria are included in Reference 16.

ECCS RESPONSE TIME tests are conducted every 24 months. The 24 month Frequency is based on the need to perform this Surveillance under the conditions that apply during a plant outage and the potential for an unplanned transient if the Surveillance were performed with the reactor at power. The 24 month Frequency is based on operating experience, and is consistent with a typical industry refueling cycle.

REFERENCES

1. USAR, Section 6.3.2.2.3.
2. USAR, Section 6.3.2.2.4.
3. USAR, Section 6.3.2.2.1.
4. USAR, Section 6.3.2.2.2.
5. USAR, Section 15.6.6.
6. USAR, Section 15.6.4.
7. USAR, Section 15.6.5.
8. 10 CFR 50, Appendix K.
9. USAR, Section 6.3.3.
10. 10 CFR 50.46.
11. USAR, Section 6.3.3.3.
12. Memorandum from R.L. Baer (NRC) to V. Stello, Jr. (NRC), "Recommended Interim Revisions to LCO's for ECCS Components," December 1, 1975.
13. USAR, Section 5.2.2.4.1.
14. SME, Boiler and Pressure Vessel Code, Section XI.
15. NEDO-32291, "System Analyses for Elimination of Selected Response Time Testing Requirements," January 1994.
16. USAR, Section 6.3, Table 6.3-1.
17. ASME/ANSI OM-1995, Appendix I, Operations and Maintenance of Nuclear Power Plants, Part 1

BASES (Continued)

SURVEILLANCE REQUIREMENTS

SR 3.6.1.6.1

~~A manual actuation of each LLS valve is performed to verify that the valve and solenoids are functioning properly and that no blockage exists in the valve discharge line. This is demonstrated by the response of the turbine control or bypass valve, by a change in the measured steam flow, the S/RV discharge pressure switch, or by any other method that is suitable to verify steam flow (e.g., tailpipe temperature). Adequate reactor steam pressure must be available to perform this test to avoid damaging the valve. Adequate pressure at which this test is to be performed is consistent with the pressure recommended by the valve manufacturer. Also, adequate steam flow must be passing through the main turbine or turbine bypass valves to continue to control reactor pressure when the LLS valves divert steam flow upon opening. Sufficient time is therefore allowed, after the required pressure and flow are achieved to perform this test.~~

~~Plant startup is allowed prior to performing this test because valve OPERABILITY and the setpoints for overpressure protection are verified, per ASME requirements, prior to valve installation. Therefore, this SR is modified by a Note that states the Surveillance is not required to be performed until 12 hours after reactor steam pressure and flow are adequate to perform the test. The 12 hours allowed for manual actuation after the required pressure and flow are reached is sufficient to achieve stable conditions for testing and provides a reasonable time to complete the SR. SR 3.6.1.6.2 and LOGIC SYSTEM FUNCTIONAL TEST performed in SR 3.3.6.4.4 overlap this Surveillance to provide complete testing of the assumed safety function.~~

A manual actuation of each required LLS valve is performed to test that the valve is functioning properly. This SR can be demonstrated by one of two methods, which is described below. If performed by Method 1, plant startup is allowed prior to performing this test because valve OPERABILITY and the setpoints for overpressure protection are verified, per ASME requirements (Ref. 4), prior to valve installation. Therefore, this SR is modified by a Note that states the Surveillance is not required to be performed until 12 hours after reactor steam pressure and flow are adequate to perform the test. The 12 hours allowed for manual actuation after the required pressure is reached is sufficient to achieve stable conditions for testing and provides a reasonable time to complete the SR. If performed by Method 2, valve OPERABILITY has been demonstrated for all installed LLS valves based upon successful offsite testing.

Method 1:

> Manual actuation of the LLS valve with verification of the response of the turbine control valves or bypass valves, by a change in the measured steam flow, or any other method suitable to verify steam flow (e.g., tailpipe temperature or acoustic monitoring). Adequate reactor steam pressure must be available to perform this test to avoid damaging the valve. Also, adequate flow must be passing through the main turbine or turbine bypass valves to continue to

(continued)

BASES

SURVEILLANCE REQUIREMENTS

SR 3.6.1.6.1 (Continued)

control reactor pressure when the LLS valves divert steam flow upon opening. Sufficient time is therefore allowed after the required pressure and flow are achieved to perform this test. Adequate pressure at which this test is to be performed is consistent with the pressure recommended by the valve manufacturer.

Method 2:

The required population of LLS S/RVs tested to satisfy SR 3.4.4.1 will be stroked in the relief mode during "as found" testing at a qualified offsite facility to verify proper operation of the S/RV. The successful performance of the S/RVs tested provides reasonable assurance that the remaining installed S/RVs will perform in a similar fashion. After the S/RVs are replaced, the relief-mode actuator of all 19 S/RVs will be uncoupled from the S/RV stem, and cycled to ensure proper operation of the control circuit and actuator. Following cycling, the relief-mode actuator is recoupled and the proper positioning of the stem nut is independently verified. This verifies that each S/RV will properly perform its intended function. If the valve actuator fails to operate due only to the failure of the solenoid but is capable of opening the valve on overpressure, the safety function of the S/RV is considered OPERABLE.

When removing and replacing the S/RVs, Foreign Material Exclusion controls will be in place to minimize the potential for unwanted materials from entering into any S/RV opening or the piping discharge lines.

The STAGGERED TEST BASIS Frequency ensures that both solenoids for each LLS valve relief-mode actuator are alternately tested. The 24 Month Frequency of the required relief-mode actuator testing is based on the tests required by ASME OM Part 1 (Ref. 4) as implemented by the Inservice Testing Program of Specification 5.5.6. The testing Frequency required by the Inservice Testing Program is based on operating experience and valve performance. Therefore, the Frequency was concluded to be acceptable from a reliability standpoint.

~~The Frequency of 24 months on a STAGGERED TEST BASIS ensures that each solenoid for each LLS valve is alternately tested. The 24 month Frequency was developed based on the S/RV tests required by the ASME Boiler and Pressure Vessel Code, Section XI (Ref. 3). The 24 month Frequency is based on operating experience, and is consistent with a typical industry refueling cycle~~

(continued)

BASES (Continued)

SURVEILLANCE REQUIREMENTS

SR 3.6.1.6.2

The LLS function S/RVs are required to actuate automatically upon receipt of specific initiation signals. A functional test is performed to verify that the mechanical portions (i.e., solenoids) of the automatic LLS function operate as designed when initiated either by an actual or simulated automatic initiation signal. The LOGIC SYSTEM FUNCTIONAL TEST in SR 3.3.6.4.4 overlaps this SR to provide complete testing of the safety function.

The 24 month Frequency is based on the need to perform this Surveillance during a plant outage and the potential for an unplanned transient if the Surveillance were performed with the reactor at power. The 24 month Frequency is based on operating experience, and is consistent with a typical industry refueling cycle.

This SR is modified by a Note that excludes valve actuation. This prevents a reactor pressure vessel pressure blowdown.

SURVEILLANCE REQUIREMENTS

REFERENCES

1. GESSAR-II, Appendix 3B, Attachment A, Section 3BA.8.
2. USAR, Section 7.6.1.11.
3. ASME, Boiler and Pressure Vessel Code, Section XI.
4. ASME/ANSI OM-1995, Appendix I, Operations and Maintenance of Nuclear Power Plants, Part 1

Valve Relief Request

VR-13

Systems: Nuclear Boiler (B21)

Valves:

1B21-F041A (ADS),	1B21-F041B (ADS),	1B21-F041C,
1B21-F041D,	1B21-F041E (ADS),	1B21-F041F (ADS),
1B21-F041G,	1B21-F041K,	1B21-F047B,
1B21-F041C,	1B21-F047D (ADS),	1B21-F047F,
1B21-F047G,	1B21-F047H (ADS),	1B21-F051A,
1B21-F051B	1B21-F051C (ADS),	1B21-F051D,
1B21-F051G (ADS)		

Category: C

Class: 1

Function: The Nuclear Boiler System provides Reactor Pressure Vessel (RPV) overpressurization protection by opening the Safety/Relief Valves (S/RVs). The S/RVs open at the high reactor pressure trip set point. In addition to overpressure protection, the S/RVs provide RPV pressure relief by opening to release steam and decrease vessel pressure. Pressure in the vessel is thereby maintained below the American Society of Mechanical Engineers (ASME) Code required limit. In addition to the above, the Automatic Depressurization System (ADS) and the individual S/RVs shall be capable of being manually operated from the main Control Room. This provides the capability to manually depressurize the RPV in the event of the Main Condenser is not available as a heat sink.

The Nuclear Boiler System ADS shall provide automatic depressurization of the RPV under certain small break Loss Of Coolant Accident (LOCA) conditions so that the low pressure Emergency Core Cooling Systems (ECCS) can adequately cool the core.

Note that all of the S/RVs, those used for ADS as well as those assigned purely for pressure relief, are used for overpressure protection. All of the S/RVs work together to ensure that the ASME Code limit is not exceeded.

Test Requirements: OM-1 (1995), Section 3.4.1(d) requires that each valve that has been maintained or refurbished in place, removed for maintenance and testing, or both, and reinstalled shall be remotely actuated at reduced or normal system pressure to verify open and close capability of the valve before resumption of electric power generation. Set-pressure verification is not required.

Basis for Relief:

Pursuant to 10 CFR 50.55a(a)(3), relief is requested from the requirements of OM-1, Section 3.4.1(d). The basis of the relief is that the proposed alternative would provide an acceptable level of quality and safety.

Currently during each PNPP refueling outage, a minimum of 9 S/RVs shall be tested with all (19) S/RVs tested within a 5-year interval. The S/RVs removed from the plant are tested for lift setpoint and seat leakage at a qualified testing facility. Following refurbishment and re-certification testing of the S/RV, the test facility tests full operation of the S/RVs, including, solenoid valve, air block valve, actuator, and relief valve stem/disk. Upon their return and re-installation each valve is full stroke exercised to satisfy the requirements of OM-1, Section 3.4.1(d).

S/RV leakage is directed to the Suppression Pool and requires challenges to the Suppression Pool cooling mode of operations through unavailability/inoperability time of the Residual Heat Removal (RHR) system.

The nuclear industry experience as a whole has shown that repeated manual actuation of the S/RVs and ADS valves can lead to valve through seat leakage during plant operation. This experience is substantiated within NUREG-1482, "Guidelines for Inservice Testing at Nuclear Power Plants", and NUREG-0626, " Generic Evaluation of Feedwater Transients and Small Break Loss-of-Coolant Accidents in GE-Designed Operating Plants and Near Term Operating License Applications", which recommend reducing the number of challenges to the ADS valves.

This relief request will allow testing of the S/RVs to be performed in two separate stages. Stage 1 will be manual actuation of the valves at the qualified test facility. This will verify the open and close function of the valve with the actuator coupled to the valve stem, and includes both solenoids and the air block valve. Each solenoid is energized, one at a time, resulting in two separate lifts of the S/RV disk from the seat. Stage 2 will be manual actuation of the S/RV actuators following installation into the plant with the actuator uncoupled from the valve stem. The plant installed testing will verify full operation of the electrical circuitry, manual actuation solenoid valve, block valve, and the actuator. Therefore, all components associated with the S/RVs will continue to be tested.

This uncoupled test may also be performed following any maintenance activity that could affect the relief mode of the associated S/RV.

With this relief request the existing test method will also remain acceptable, i.e., full stroke exercise from the control room at adequate reactor steam pressure and flow.

The proposed test alternative provides verification of proper control connections by requiring the pneumatic and electrical controls to cycle the actuator on each S/RV following installation, without stroking the S/RV itself. The plant installed testing will verify full operation of the electrical circuitry, manual actuation solenoid valve, block valve, and the actuator. In addition, the test populations of S/RVs removed each refuel outage for setpoint testing would also be tested in the relief mode during bench testing. This setpoint testing provides assurance that the S/RV would perform as expected when control air pressure is applied to the actuator assembly.

The proposed test alternative continues to demonstrate full functionality of the S/RVs while minimizing the potential for creating valve seat leakage caused by cycling the valve unnecessarily at power. Therefore, the proposed test alternative provides an acceptable level of quality and safety.

Alternate Testing:

Manual actuation of the valves at the qualified test facility will verify the open and close function of the valve with the actuator coupled to the valve stem. This actuation includes both solenoids and the air block valve, with each solenoid being energized, one at a time, and results in two separate lifts of the S/RV disk from the seat.

Upon re-installation, uncoupled manual actuation will verify the appropriate function of the electric circuit, both solenoid valves, air block valve, and the valve actuator. This actuation includes both solenoids by lifting of the actuator with the first solenoid and maintaining the actuator open using the second solenoid, thereby, only lifting the actuator once.