January 2, 2004

Mr. Roy A. Anderson
President & Chief Nuclear Officer
PSEG Nuclear, LLC - X04
Post Office Box 236
Hancocks Bridge, NJ 08038

SUBJECT: SALEM NUCLEAR GENERATING STATION, UNIT NO. 2 - EVALUATION OF RELIEF REQUESTS S2-RR-03-V01 AND S2-RR-03-V02 (TAC NO. MC1102)

Dear Mr. Anderson:

By letter dated October 22, 2003, as supplemented on October 23 and 24, 2003, PSEG Nuclear, LLC (PSEG) submitted proposed revisions to its Inservice Testing (IST) Program for the Salem Nuclear Generating Station (Salem), Unit No. 2. The proposed revisions to the IST Program, Relief Requests S2-RR-03-V01 and S2-RR-03–V02, were submitted pursuant to Title 10 of the *Code of Federal Regulations* (10 CFR), Section 50.55a(f)(5)(iii), based on the impracticality of performing certain testing in accordance with the American Society of Mechanical Engineers Boiler and Pressure Vessel Code (ASME Code) requirements. The relief requests were needed, on an expedited basis, to support the Salem, Unit No. 2, refueling outage (2R13). On October 23, 2003, the U.S. Nuclear Regulatory Commission (NRC) staff granted verbal relief to the licensee for these two relief requests to be followed up by the staff's final review and written evaluation.

The NRC staff has completed its review, and has determined that: (1) compliance with the specified ASME Code testing requirements for the specified check valves is impractical; and (2) the proposed alternative testing will provide reasonable assurance of the operational readiness of the valves. Therefore, the proposed relief is granted for the third IST interval at Salem, Unit No. 2, pursuant to 10 CFR 50.55a(f)(6)(i). Additionally, the following condition is imposed by the NRC staff pursuant to 10 CFR 50.55a(f)(6)(i): PSEG's IST Program must include the condition that, when the acceptance criterion of 28.1 seconds is exceeded during testing, both the SJ55 and SJ56 check valves associated with a specific accumulator will be evaluated for the need for corrective action. The NRC staff has determined that granting relief, pursuant to 10 CFR 50.55a(f)(6)(i), is authorized by law and will not endanger life or property or the common defense and security, and is otherwise in the public interest giving due consideration to the burden upon the licensee that could result if the requirements were imposed on the facility. The NRC staff's Safety Evaluation is enclosed.

If you have any questions regarding this relief request, please contact the Salem Project Manager, Mr. Robert Fretz, at 301-415-1324.

Sincerely,

/R B Ennis for/

Darrell Roberts, Acting Chief, Section 2
Project Directorate I
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

Docket No. 50-311

Enclosure: As stated

cc w/encl: See next page

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Salem Nuclear Generating Station, Unit No. 2

cc:

Mr. A. Christopher Bakken, III
Senior Vice President - Site Operations
PSEG Nuclear - X15
P.O. Box 236
Hancocks Bridge, NJ 08038

Mr. John T. Carlin
Vice President - Nuclear Assessments
PSEG Nuclear - N10
P.O. Box 236
Hancocks Bridge, NJ 08038

Mr. David F. Garchow
Vice President - Eng/Tech Support
PSEG Nuclear - N28
P.O. Box 236
Hancocks Bridge, NJ 08038

Mr. Gabor Salamon
Manager - Licensing
PSEG Nuclear - N21
P.O. Box 236
Hancocks Bridge, NJ 08038

Jeffrie J. Keenan, Esquire
PSEG Nuclear - N21
P.O. Box 236
Hancocks Bridge, NJ 08038

Ms. R. A. Kankus
Joint Owner Affairs
PECO Energy Company
Nuclear Group Headquarters KSA1-E
200 Exelon Way
Kennett Square, PA 19348

Lower Alloways Creek Township
c/o Mary O. Henderson, Clerk
Municipal Building, P.O. Box 157
Hancocks Bridge, NJ 08038

Dr. Jill Lipoti, Asst. Director
Radiation Protection Programs
NJ Department of Environmental
Protection and Energy
CN 415
Trenton, NJ 08625-0415

Brian Beam
Board of Public Utilities
2 Gateway Center, Tenth Floor
Newark, NJ 07102

Regional Administrator, Region I
U.S. Nuclear Regulatory Commission
475 Allendale Road
King of Prussia, PA 19406

Senior Resident Inspector
Salem Nuclear Generating Station
U.S. Nuclear Regulatory Commission
Drawer 0509
Hancocks Bridge, NJ 08038

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

REQUESTS FOR RELIEF S2-RR-03-V01 and S2-RR-03-V02

SECOND 10-YEAR INSERVICE INSPECTION INTERVAL

SALEM NUCLEAR GENERATING STATION, UNIT NO. 2

PSEG NUCLEAR, LLC

DOCKET NO. 50-311

1.0 INTRODUCTION

By letter dated October 22, 2003, as supplemented on October 23 and 24, 2003, PSEG Nuclear, LLC (PSEG or the licensee) submitted proposed revisions to its Inservice Testing (IST) Program for the Salem Nuclear Generating Station (Salem), Unit No. 2. The proposed revisions to the IST Program, Relief Requests S2-RR-03-V01 and S2-RR-03-V02, were submitted pursuant to Title 10 of the *Code of Federal Regulations*, Section 50.55a(f)(5)(iii), based on the impracticality of performing testing in accordance with the American Society of Mechanical Engineers Boiler and Pressure Vessel Code (ASME Code) requirements. In the relief requests, PSEG requested approval to use an alternative to the ASME Code, Section XI requirements pertaining to the safety injection (SI) accumulator outlet check valves 21SJ55, 22SJ55, 23SJ55, 24SJ55, 21SJ56, 22SJ56, 23SJ56, and 24SJ56. Specifically, PSEG proposed: (1) an alternative to the ASME Code exercise test frequency requirements of the ASME OM [operations and maintenance] Code, Part 10 standard, Paragraph-4.3.2.1, so that it may use a calculation method together with a partial accumulator dump test to verify that each check valve disk is exercised; and (2) relief from the check valve decay time acceptance criterion of 27 seconds that was imposed by the U.S. Nuclear Regulatory Commission (NRC or Commission) staff's March 12, 1999, approval of Relief Requests V-24 and V-25 by changing the check valve decay time acceptance criterion to 28.1 seconds.

In a March 12, 1999, letter, the NRC staff reviewed Relief Requests V-24 and V-25, which proposed revisions to the IST Program for Salem, Unit Nos. 1 and 2. Relief Requests V-24 and V-25 proposed: (1) an alternative to the ASME Code test frequency requirement of IWV-3521 and IWV-3522 that would allow the testing of each check valve during refueling outages (RFOs); and (2) relief from the exercise procedure requirements of IWV-3522(b) in order to allow the use of a partial accumulator dump test to verify that each check valve is exercised to its safety position. Relief was approved pursuant to 10 CFR 50.55a(f)(4)(iv) for the IWV-3521 and IWV-3522 requirements because the proposed alternative frequency met the test frequency requirements of the 1989 Edition of the ASME Code. Also, pursuant to

10 CFR 50.55a(f)(6)(i), relief was granted for the use of the partial accumulator dump test in lieu of the IWV-3522(b) requirements because of the impracticality of performing testing in accordance with the ASME Code requirements. The NRC staff additionally imposed, in the granting of Relief Requests V-24 and V-25, that the licensee adjust its acceptance criterion to 27 seconds and if the acceptance criterion is exceeded, both the SJ55 and SJ56 check valves of the associated accumulator will be subject to corrective action.

However, since the NRC staff's granting of Reliefs Requests V-24 and V-25, modifications have been made in order to address maintenance issues for the SJ54 Accumulator Isolation Valves at Salem, Unit No. 2. These modifications increased the valve's stroke time, thus changing the system dynamics such that the measured time for the partial accumulator dump test was lengthened. Due to this lengthened test time, the licensee no longer meets the acceptance criterion of 27 seconds that was imposed by the NRC staff when it approved Relief Requests V-24 and V-25. PSEG's design change process failed to identify the function performed by the SJ54 valves in the service testing of the SJ55 and SJ56 check valves and, therefore, the licensee submitted Relief Requests S2-RR-03-V01 and S2-RR-03-V02 in order to increase the acceptance criterion from 27 seconds to 28.1 seconds to reflect the new system dynamics.

2.0 REGULATORY EVALUATION

Section 50.55a to 10 CFR requires that the IST of certain ASME Code Class 1, 2, and 3 pumps and valves be performed in accordance with Section XI of the ASME Code and applicable Addenda, except where relief has been requested and granted or proposed alternatives have been authorized by the Commission pursuant to 10 CFR 50.55a(f)(6)(i), (a)(3)(i), or (a)(3)(ii). In order to obtain authorization or relief, the licensee must demonstrate that: (1) conformance is impractical for its facility; (2) the proposed alternative provides an acceptable level of quality and safety; or (3) compliance would result in a hardship or unusual difficulty without a compensating increase in the level of quality and safety. Section 50.55(a)(f)(4)(iv) of 10 CFR provides that ISTs of pumps and valves may meet the requirements set forth in subsequent editions and addenda that are incorporated by reference in 10 CFR 50.55a(b), subject to the limitations and modifications listed, and subject to Commission approval. NRC guidance contained in Generic Letter (GL) 89-04, "Guidance on Developing Acceptable Inservice Testing Programs," provided alternatives to the ASME Code requirements determined to be acceptable to the staff, and authorized the use of the alternatives in Positions 1, 2, 6, 7, 9, and 10, provided the licensee follows the guidance delineated in the applicable position.

Section 50.55a of 10 CFR authorized the Commission to grant relief from ASME Code requirements or to approve proposed alternatives upon making the necessary findings. The NRC staff's findings with respect to granting, or not granting, the relief request or authorizing the proposed alternative as part of the licensee's IST program are contained in the Safety Evaluation (SE).

3.0 TECHNICAL EVALUATION

Relief Requests S2-RR-03-V01 and S2-RR-03-V02 propose the same alternative testing, therefore, a single evaluation will be provided for both relief requests. The ASME Code of record for Salem, Unit No. 2, IST program for pumps and valves is the 1989 Edition of ASME

Code, Section XI. The 1989 ASME Code, Section XI, references the OM Part 10 standard (OM-10) for IST of valves.

3.1 Relief Requests S2-RR-03-V01 and S2-RR-03-V02:

3.1.1 Component Identification:

Check valves 21SJ55, 22SJ55, 23SJ55, 24SJ55, 21SJ56, 22SJ56, 23SJ56, and 24SJ56 for Salem, Unit No. 2 (eight total check valves) are located in the discharge lines downstream from the safety injection SI accumulators and the branch connection of the residual heat removal (RHR) system. The valves must be capable of opening during a large-break-loss-of-coolant-accident (LOCA) to provide a flow path for the SI accumulator discharge into the reactor coolant system (RCS) cold legs. The valves must also be capable of opening to provide a path for low head safety injection and cold leg recirculation flow. Additionally, these valves serve as RCS pressure isolation valves by preventing SI accumulators and RHR system piping from being exposed to RCS pressure.

All eight check valves are ASME Code Class 1, Category C. The licensee requests relief from the requirements in Paragraph 4.3.2.1 of ASME Code OMa-1988, Part 10 standard (OM-10), which requires that check valves be exercised at least once every three months. In addition, OM-10, subparagraph 4.3.2.4(a), requires that normally-closed check valves whose function is to open on reversal of pressure differential shall be tested when the closing differential pressure is removed and flow through the valve is initiated. Relief from the exercise procedure requirements of OM-10, subparagraph 4.3.2.4(a), is also necessary because the licensee's test method does not appear to be in accord with either the ASME Code requirement nor the staff's guidance in GL 89-04, Position 1, for verifying valve obturator movement. The licensee has proposed to use a partial accumulator dump test with an acceptance criterion for the accumulator decay time that is developed by a calculation method every RFO for all eight valves.

3.1.2 Licensee's Basis for Requesting Relief:

The licensee stated:

> RR S2-RR-03-V01:
>
> During power operation, these valves are maintained in the closed position by RCS pressure on the downstream side of the valve disk. Quarterly exercising these valves to the full or partially open position during power operation is impracticable because the only flow path is into the RCS. The operating accumulator pressure cannot overcome normal operating RCS pressure to establish flow. Full stroke exercising these valves at cold shutdown is impracticable because of the potential for low temperature overpressurization due to insufficient expansion volume in the RCS to accept required flow. This testing could also result in the intrusion of nitrogen into the core which could interrupt the normal circulation of cooling water flow. Partial stroke exercising these valves going into cold shutdown is burdensome without a commensurate increase in the level of quality and safety. The associated motor-operated

isolation valve (one per accumulator) cannot be partially stroked, but must complete a full stroke before changing direction. This could cause a complete discharge of the water volume in the accumulator and possibly inject nitrogen into the reactor coolant system, causing gas binding of the residential heat removal pumps and a subsequent loss of shutdown cooling. These valves are also verified to close by leak testing per plant technical specifications for Pressure Isolation Valves (PIV's). Reverse exercising these check valves at any time other then refueling is burdensome without a commensurate increase in the level of quality and safety. The valves are normally in the closed position. Accumulator pressure is continuously monitored to ensure that an adequate nitrogen blanket is maintained and to verify the lack of RCS in leakage.

RR S2-RR-03-V02:

During power operation, these valves are maintained in the closed position by RCS pressure on the downstream side of the valve disk. Quarterly exercising these valves to the full or partially open position during power operation is impracticable because the only flow path is into the RCS. The operating accumulator pressure cannot overcome normal operating RCS pressure to establish flow. Full stroke exercising these valves at cold shutdown is impracticable because of the potential for low temperature overpressurization due to insufficient expansion volume in the RCS to accept required flow. This testing could also result in the intrusion of nitrogen into the core which could interrupt the normal circulation of cooling water flow. The associated motor-operated isolation valve (one per accumulator) cannot be partially stroked, but must complete a full stroke before changing direction. This could cause a complete discharge of the water volume in the accumulator and possibly inject nitrogen into the reactor coolant system, causing gas binding of the residential heat removal pumps and a subsequent loss of shutdown cooling. These valves are also verified to close by leak testing per plant technical specifications for Pressure Isolation Valves (PIV's). Reverse exercising these check valves at any time other then refueling is burdensome without a commensurate increase in the level of quality and safety.

3.1.3 Alternative Testing:

The licensee proposed:

RR S2-RR-03-V01:

These check valves shall be full stroke exercised to the open position during refuelings utilizing a reduced pressure, partial accident flow test method. This controlled method is performed with the reactor vessel head removed. The test method establishes accumulator pressure between 67 and 70 psig, accumulator level between 96 and 100% and refueling cavity level between 125.5 and 126.5 feet. After establishment of the fixed parameters, the test then measures the time interval required for the pressure in the associated safety injection accumulator to drop from an initial pressure to 35 psig. Engineering calculation

S-2-SJ-MDC-I394 - “Accumulator Pressure Decay during Discharge Test” establishes the test conditions and acceptance criterion and concludes that this methodology is adequate in determining the associated check valve disk moves to the full open position. Information from other nuclear stations was reviewed regarding partial flow, full stroke exercising using a calculational method. The testing performed at Salem provides a valid methodology for verifying the open function even though the test method differs from the various methods reviewed.

In attempting to utilize the guidance of NUREG 1482, Section 4.1.2 - “Exercising Check Valves with Flow and Nonintrusive Techniques,” nonintrusive equipment was used during informational testing. These valves are Darling Valve & Manufacturing Co. “Clear Waterway” swing checks that are fabricated without a backstop. The valve design permits the disk to move sufficiently out of the flow path without contacting the valve body. Nonintrusive testing using acoustic and magnetic technology provides sufficient data for monitoring degradation on a periodic basis, however, full open acoustic indication is not detected nor is expected to show on the test trace. Nonintrusive testing does not verify full stroke exercising, however occasional use of this equipment during the pressure decay test provides useful condition monitoring information.

This method of forward flow check valve testing complies with the guidance provided in Generic Letter 89-04, Attachment 1, Position 1.

Regarding reverse flow exercise testing, these valves shall be verified in the closed position during the process of performing seat leakage testing at the frequency specified in Unit 1 TS 4.4.6.3 and Unit 2 TS 4.4.7.2.2.

The open stroke frequency change was previously approved in NRC Safety Evaluation April 15, 1994 (TAC Nos. M88144 and M88145)

The use of the alternate testing methodology was previously approved in NRC Safety Evaluation March 12, 1999 (TAC Nos. M98259 and M98260)

RR S2-RR-03-V02:

These check valves shall be full stroke exercised to the open position during refuelings utilizing a reduced pressure, partial accident flow test method. This controlled method is performed with the reactor vessel head removed. The test method establishes accumulator pressure between 67 and 70 psig, accumulator level between 96 and 100% and refueling cavity level between 125.5 and 126.5 feet. After establishment of the fixed parameters, the test then measures the time interval required for the pressure in the associated safety injection accumulator to drop from an initial pressure to 35 psig. Engineering calculation S-2-SJ-MDC-I394 - “Accumulator Pressure Decay during Discharge Test” establishes the test conditions and acceptance criterion and concludes that this methodology is adequate in determining the associated check valve disk moves to the full open position. Information from other nuclear stations was reviewed regarding partial flow, full stroke exercising using a calculational method. The

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The valves shall be partial stroke exercised at cold shutdown during normal RHR shutdown cooling operations.

This method of forward flow check valve testing complies with the guidance provided in Generic Letter 89-04, Attachment 1, Position 1.

Regarding reverse flow exercise testing, these valves shall be verified in the closed position during the process of performing seat leakage testing at the frequency specified in Unit 1 TS 4.4.6.3 and Unit 2 TS 4.4.7.2.2.

The open stroke frequency change was previously approved in NRC Safety Evaluation April 15, 1994 (TAC Nos. M88144 and M88145).

The use of the alternate testing methodology was previously approved in NRC Safety Evaluation March 12, 1999 (TAC Nos. M98259 and M98260).

3.1.4 Evaluation:

The ASME Code of record for the third IST interval at Salem, Unit No. 2, is the 1989 Edition of the ASME Code, Section XI, which references the ASME OM-10 standard for IST of valves. Specifically, the Category C accumulator check valves shall be operated and maintained in accordance with OM-10, Paragraph 4.3.2.1, which requires that each valve be exercised nominally every three months. The intent of this requirement is to ensure that the check valves will function as needed during a LOCA. In accordance with 10 CFR 50.55a(f)(5)(iii), the licensee has requested relief from the above requirements in order to exercise the check valves only during RFOs, utilizing a reduced pressure, partial-accident flow test method.

The accumulator check valves in question, 21SJ55, 22SJ55, 23SJ55, 24SJ55, 21SJ56, 22SJ56, 23SJ56, and 24SJ56 are Category C, Darling Valve & Manufacturing Co. "Clear Waterway" swing check valves that were fabricated without a backstop. The valves, also, are not equipped with a mechanical exerciser nor position indication devices. The valves are located in the discharge lines of their respective safety injection accumulators. They perform an active safety function in the open and closed positions and must be capable of opening

during a LOCA to provide a flow path for SI accumulator discharge to the RCS cold legs when reactor pressure drops below accumulator pressure. These valves further function as RCS pressure isolation valves that function to prevent the SI accumulators and RHR system piping from being exposed to RCS pressure.

Upon review of the licensee's requests for relief, S2-RR-03-V01 and V02, the NRC staff finds that the quarterly testing of these check valves during power operation is impractical. During power operation, the valves are maintained in a closed position by the significant pressure differential between the RCS and the SI accumulators. The valves are only capable of being exercised when the operating accumulator pressure overcomes the RCS pressure and thus establishing flow. Additionally, exercising during cold shutdowns may not be practical. During cold shutdowns, the RCS lacks adequate expansion volume to accommodate the required flow and a low temperature overpressure condition could result. These valves could only be full-stroke exercised quarterly or during cold shutdown if extensive system modifications were performed, such as installing full-flow test loops.

Accordingly, the NRC staff has reviewed the licensee's proposed alternative and has determined that exercising the eight applicable accumulator check valves during RFOs meets the intent of OM-10, Paragraph 4.3.2.2(e), which states that if it is not practical to exercise Category C check valves during plant operation or cold shutdowns, they may be exercised during RFOs. Therefore, exercising the check valves during RFOs is permitted by ASME OM-10.

All Category C check valves must be exercised in accordance with the requirements of OM-10, Paragraph 4.3.2.4(a), "Valve Obturator Movement," which requires that the necessary valve obturator movement shall be demonstrated by exercising the valve and observing that either the obturator travels to the seat on cessation or reversal of flow, or open to the position required to fulfill its function, or both. Confirmation of the disk moving away from the seat shall be by a position indicating device, changes in system pressure, flow rate, level, temperature, seat leakage testing, or other positive means. However, in accordance with 10 CFR 50.55a(f)(5)(iii), the licensee has requested relief from the above requirements so that they may use a calculation method together with a partial accumulator dump test to verify that each check valve disk is exercised.

Additional guidance for exercising Category C check valves has been provided by the NRC staff in GL 89-04 and in NUREG 1482. GL 89-04, Position 1, states that a check valve's full stroke to open is valid when a known flow rate is passed through the valve which exceeds the maximum flow rate. The applicable accumulator check valves, however, cannot pass the maximum accident flow through the check valves at any plant condition. The valves were not equipped with a mechanical exerciser or position indication devices. In addition, due to the lack of a backstop, the licensee indicated that the guidance of NUREG 1482, Section 4.1.2 "Exercising Check Valves with Flow and Nonintrusive Techniques," might not be applicable because the test does not provide sufficient indication that the check valves have been full-stroke exercised. This nonintrusive testing, using acoustic and magnetic technology, provides sufficient data for monitoring degradation on a periodic basis; however, full open acoustic indication is not detected nor is expected to show on the test trace. Therefore, since neither GL 89-04 nor NUREG 1482 provides appropriate guidance to adequately determine that the

check valves have been full-stroke exercised, it is not practical for the licensee to verify the movements of these valves in accordance with the ASME Code requirements.

The licensee has, however, proposed to use a timed partial accumulator dump test to verify that each pair of accumulator check valves is exercised to the position required to fulfill their safety functions. The acceptance criterion, the time it takes for the accumulator pressure to decay from 70 psig to 35 psig, was mathematically derived through calculations (Attachment 3 of licensee's October 22, 2003, submittal) and validated through testing. The NRC staff has stated that use of a combination of tests and analyses to verify check valve forward exercising meets the intent of the ASME Code requirements for similar check valve applications at other facilities. The staff's review of the licensee's method revealed one distinct difference in the Salem method from methods used by other licensees which is discussed below.

Each Salem unit has four accumulators which are designed to inject water into the reactor core through the RCS cold legs when the RCS pressure decreases below the accumulator pressure. The flow of water out of the accumulator will pass through the open motor-operated gate valve (SJ54) and two check valves, the accumulator isolation check valve (SJ55) and the combined safety injection header check valve (SJ56). The flow is then directed into the reactor vessel through the cold leg. During the partial accumulator dump test, the flow path is the same with the discharged accumulator water either increasing the level in the reactor cavity or the vented pressurizer, depending on whether the reactor head is off or on. The licensee has modeled both configurations in its analysis.

The licensee's calculation method was previously reviewed and approved by the NRC staff by a letter dated March 12, 1999, "RRs V24 and V-25 Regarding Testing of Accumulator Check Valves, Salem Nuclear Generating Station, Unit Nos. 1 and 2." However, since then a design change was implemented during the last Salem, Unit No. 2 outage that changed the stroke time of motor operated valves (MOV's) 21SJ54, 21SJ54, 21SJ54, and 21SJ54. The subject valves are 10-inch Velan gate valves with SMB-3 Limitorque operators. Two modifications to these valves were made: first, the gear ratio was changed to slow the valve stroke; and second, the valve was made limit-seated (vs. torque-seated). Both modifications were designed to address the high internal forces that cause overthrusting in the valve. This overthrusting can result in significant internal valve damage due to the valve disc being driven into the valve seat with too much force. The consequences of this design change was a lengthened MOV stroke time which in effect caused a slower accumulator pressure decay during check valve testing.

These changes do not, however, invalidate the conclusions of the approved Relief Requests, V-24 and V-25, because the new calculation method is conceptually identical to the previous method with the exception that the MOV stroke time has been lengthened from 12.5 to 19.3 seconds. The new calculation is a one-dimensional analysis of the motion of applicable check valve disks, flow of water from the accumulator to the reactor vessel including accounting for resistance from valves and piping, change in nitrogen pressure of the accumulator, and the effect on the water level in the accumulator and reactor vessel or pressurizer (depending on the analysis). A series of equations were derived and solved simultaneously in a computer program. Accumulator pressures as a function of time for various check valve maximum swing angles (angle of check valve disk in flow stream) were plotted. Discharge flow rate as a function of time was also plotted for various disk angles. Results showed that when the check valve disk was free to move (full open), the time for the accumulator pressure to decay from 70

psig to 35 psig was 26.5 seconds. As the maximum swing angle of the check valve disk was decreased, the time to decay to 35 psig increased. Table 4.2 of the licensee's calculation shows that at a maximum swing angle of 60 degrees, the time for the accumulator discharge pressure to decay from 70 psig to 35 psig is approximately 30.1 seconds. Table 4.3 of the licensee's calculation shows that the decay time increases to approximately 42 seconds when the swing angle is reduced to 30 degrees.

In examining the calculation results and test data, the key to the validity of the analysis is the assumption that the minimum fluid velocity (V_{min}) is constant as defined by the manufacturer for each of the applicable accumulator check valves. The actual V_{min}, provided by the valve manufacturer, is 20 feet per second (fps). Thus, in the licensee's calculations, if V_{min} equals 20 fps it can be assumed that the valve is in adequate operating condition at the time of the test. This has been verified by the licensee in previous valve inspections. However, over time, there is a potential for these valves to corrode or become obstructed, thus changing the value of V_{min}. If valve degradation such as corrosion or obstruction occurs, the valves would be affected such that a larger value of V_{min} would be needed in order maintain the valve's disk in the full open position.

The licensee has additionally noted that by using a constant value for V_{min} (20 fps), its calculations will only provide a valid representation of the check valve's disk motion when the valve is in good operating condition. The licensee has, therefore, conducted testing to establish an acceptance criteria for the time that it takes for the accumulator pressure to degrade from 70 psig to 35 psig after the accumulator isolation gate valve is opened (under good operating conditions, V_{min} = 20 fps). The licensee established this acceptance criteria in accordance with ASME OM-10, Subarticle 2. Subarticle 2 states that the owner shall specify test conditions and shall identify, categorize, and list in the plant records, its specified acceptance criteria for the testing of each valve.

The NRC staff finds that the calculation method PSEG used to establish the proposed check valve acceptance criterion of 28.1 seconds is an acceptable alternative to the ASME Code requirements. PSEG's method is acceptable because, if a check valve's condition degrades or otherwise becomes obstructed, the time it takes for the associated accumulator to decay from 70 psig to 35 psig is expected to increase. Thus, if accumulator decay time increases to the point where it will no longer meet the proposed acceptance criterion of 28.1 seconds, the two check valves connected to that accumulator will no longer be considered to be in an acceptable operating condition. Both check valves would be considered to be degraded because the proposed alternative testing is unable to discern which valve is the cause for the increased testing decay time.

Therefore, another important consideration when implementing PSEG's proposed alternative is the extent that corrective action is pursued when a test exceeds the acceptance criterion of 28.1 seconds. As previously stated, when the NRC granted relief for Relief Requests V-24 and V-25, the NRC staff imposed a requirement that both the SJ55 and SJ56 check valves be subject to corrective action if the test acceptance criterion of 27 seconds was exceeded. PSEG was not explicit in its description of proposed testing for Relief Requests S2-RR-03-V01 and V02, and did not state whether or not it would require corrective action for both the SJ55 and SJ56 check valves if the new acceptance criterion of 28.1 seconds was exceeded. Therefore, because the proposed partial accumulator dump test is unable to determine whether or not a

specific check valve has degraded, the NRC staff is imposing a requirement that both check valves associated with a specific accumulator will be subject to corrective action in the event that the acceptance criterion of 28.1 seconds is exceeded.

The licensee's test method of using a calculation does not fully meet the ASME Code requirements because it does not verify directly that the check valve has moved to its safety position or passed the required accident flow rate. However, the NRC staff finds that the licensee's test methodology meets the intent of OM-10, Paragraph 4.3.2.4(a), for verifying obturator movement, and will provide reasonable assurance of operational readiness of the applicable accumulator check valves. The NRC staff also finds that the licensee's proposed alternative testing, in conjunction with the condition that both the SJ55 and SJ56 check valves will be subject to corrective action if the test acceptance criterion of 28.1 seconds is exceeded, is acceptable because: (1) the calculation method has been validated by test results; (2) an acceptance criterion will be derived using an appropriate analytical method; and (3) appropriate corrective action will be taken if the acceptance criterion is exceeded. Therefore, in accordance with 10 CFR 50.55a(f)(6)(i), the NRC staff grants relief from the requested ASME Code requirements.

4.0 CONCLUSION

The NRC staff concludes that the licensee's request to test the check valve every RFO in lieu of every three months meets the requirements in OM-10, Paragraph 4.3.2.2(e). The licensee's request for relief from the exercise procedure requirements of OM-10, Paragraph 4.3.2.4(a), in order to use a partial accumulator dump test to verify that the check valve is exercised to its safety position, is granted pursuant to 10 CFR 50.55a(f)(6)(i) on the basis that the alternative testing meets the intent of the ASME Code requirements and will provide reasonable assurance of the check valve's operational readiness. Additionally, the following condition is imposed by the NRC staff pursuant to 10 CFR 50.55a(f)(6)(i): PSEG's IST Program must include the condition that, when the acceptance criterion of 28.1 seconds is exceeded during testing, both the SJ55 and SJ56 check valves associated with a specific accumulator will be evaluated for the need for corrective action. The NRC staff has determined that granting relief, pursuant to 10 CFR 50.55a(f)(6)(i), is authorized by law and will not endanger life or property or the common defense and security, and is otherwise in the public interest giving due consideration to the burden upon the licensee that could result if the requirements were imposed on the facility.

Principal Contributor: M. Dudek

Date: January 2, 2004