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10 CFR 50.55a

TMI-12-168

November 7, 2012

U.S. Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, DC 20555-0001

Three Mile Island Nuclear Station, Unit 1
Renewed Facility Operating License No. DPR-50
NRC Docket No. 50-289

Subject: Submittal of Relief Requests Associated with the Fifth Inservice Testing (IST) Interval

Attached for your review are relief requests associated with the fifth Inservice Testing (IST) interval for Three Mile Island Nuclear Station (TMI), Unit 1. The fifth interval of the TMI, Unit 1 IST program complies with the American Society of Mechanical Engineers (ASME) Code for Operation and Maintenance of Nuclear Power Plants, 2004 Edition with Addenda through OMb-2006 Addenda. The fifth IST interval will begin on October 15, 2013. We request your approval by November 7, 2013.

There are no regulatory commitments in this letter.

If you have any questions concerning this letter, please contact Tom Loomis at (610) 765-5510.

Respectfully,

Michael D. Jesse
Director - Licensing & Regulatory Affairs
Exelon Generation Company, LLC

Attachment: Relief Requests Associated with the Fifth Ten-Year Interval for Three Mile Island Nuclear Station, Unit 1

cc: Regional Administrator, Region I, USNRC
USNRC Senior Resident Inspector, TMI
Project Manager, [TMI] USNRC

Attachment

Relief Requests Associated with the Fifth Ten-Year Interval for Three Mile Island Nuclear Station, Unit 1

PR-01
PR-02
VR-02

RELIEF REQUEST PR-01

Relief Request Concerning Nuclear Services Closed Cooling Water Flow Rate Measurement During Group A Tests In Accordance with 10 CFR 50.55a(f)(5)(iii)

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1. ASME Code Component(s) Affected

NS-P-1A, Nuclear Services Closed Cooling Water (NSCCW) Pump 1A (Centrifugal / Group A / Class 3)
NS-P-1B, Nuclear Services Closed Cooling Water Pump 1B (Centrifugal / Group A / Class 3)
NS-P-1C, Nuclear Services Closed Cooling Water Pump 1C (Centrifugal / Group A / Class 3)

Component/System Function

The NSCCW system includes four 33.33-percent capacity nuclear services coolers, and three 50-percent capacity NSCCW pumps. This system, along with the intermediate cooling system, satisfies the cooling requirements of all nuclear-oriented services other than decay heat and reactor building emergency cooling. In the event of a loss-of-coolant accident, 100-percent redundancy of all nuclear services equipment may be obtained by isolating nonessential items so that flow requirements are reduced to approximately half that of normal operation.

2. Applicable Code Edition and Addenda

ASME OM Code-2004 Edition, with Addenda through OMb-2006

3. Applicable Code Requirement(s)

ISTB-5121(b) - "Group A Test Procedure" - "The resistance of the system shall be varied until the flow rate equals the reference point... ...Alternatively, the flow rate shall be varied until the differential pressure equals the reference point..."

4. Impracticality of Compliance

Pursuant to 10 CFR 50.55a(f)(5)(iii), relief is requested from the requirement of ASME OM Code ISTB-5121(b). Due to system design and plant operating requirements, it is not practical to reduce the number of pumps in service to one to allow for single-pump testing during power operation. Also, individual pump flow rates cannot be measured during the Group A test. The flow instrumentation for this system is located in the common discharge header for all three of the subject pumps. The piping configuration does not contain, nor would the system design permit the installation of accurate individual pump flow

measuring devices due to the turbulence caused by the valving and elbow configuration on the discharge of the pumps. There were no provisions originally designed in the system to measure individual pump flow rate.

5. Burden Caused by Compliance

Individual pump flow cannot be measured during normal quarterly operations since individual flow instrumentation does not exist. Also, two pumps are normally required to be in service to provide adequate cooling for system components.

To comply with the ISTB requirement for measuring individual pump flow rates on a quarterly basis, a modification of the system would be required.

6. Proposed Alternative and Basis for Use

Individual suction and discharge pressure gauges are installed at each pump allowing for measurement of differential pressure for inservice testing. A flow instrument is installed in the common discharge header.

The proposed test would test (as approved previously in PR-02 for the fourth interval) NSCCW pumps in pump pairs. As stated previously, individual pump flow cannot be measured during quarterly operations since individual flow instrumentation does not exist. Also, two (2) pumps are normally required to be in service to provide adequate cooling for system components. The NSCCW pumps are centrifugal pumps (not vertical line shaft). The current quarterly inservice procedure tests all combinations of paired-pumps (A-B, B-C, A-C). During these tests, pump dP (differential pressure) is set, and combined pump flow rate is measured.

Individual pump flow rates will be calculated and compared against individual pump flow rate reference values. Corrective actions will be taken in accordance with ISTB-6200, "Corrective Action," in the event that these criteria are not met. The pumps will continue to be tested individually in accordance with ISTB-5123, "Comprehensive Test Procedure," during refueling outages.

Additionally, vibration data on the pump will be recorded and compared to the reference values. Any deviation from the reference value will be compared to the Code acceptance criteria. The current testing methodology of testing paired-combinations of pumps near two-pump design flow rate provides an adequate basis for identifying and evaluating degraded pump performance. Therefore, this testing method provides reasonable assurance of pump operational readiness.

The following is a summary of proposed alternative testing:

a. TMI, Unit 1 will continue to perform quarterly testing using a modified Group A test procedure as described above. With two paired-pumps in service, the required Group A test parameters will be measured except for individual pump flow rate. Individual pump flow rates will be calculated and compared against calculated individual pump flow rate reference values. During this test, the differential pressure for each pump will be throttled to the reference value.

b. Vibration measurements will be recorded and compared to their reference values. Deviations from the reference value will be compared with the ranges specified in Table ISTB-5121-1 for Group A tests. Corrective actions will be taken in accordance with ISTB-6200.

c. During testing of the subject pumps (quarterly and refueling), TMI, Unit 1 will perform full spectrum vibration analysis, which is above Code required vibration testing.

d. The pumps will continue to be tested individually in accordance with ISTB-5123, "Comprehensive Test Procedure," during refueling outages.

Using the provisions of this relief request as an alternative to the specific requirements of ISTB-5121(b) will provide reasonable assurance of pump operational readiness. Therefore, pursuant to 10 CFR 50.55a(f)(5)(iii), TMI, Unit 1 requests relief from the specific ISTB requirements identified in this request.

7. Duration of Proposed Alternative

The proposed alternative identified will be utilized during the fifth IST interval which is scheduled to begin October 15, 2013 and conclude on October 14, 2023.

8. Precedents

A similar Relief Request (P5) was approved for TMI, Unit 1 for the third 10-year interval as documented in the U.S. Nuclear Regulatory Commission's Safety Evaluation Report dated July 2, 2004 (ML041670196).

A similar Relief Request (PR-02) was approved for TMI, Unit 1 for the fourth 10-year interval as documented in the U.S. Nuclear Regulatory Commission's Safety Evaluation Report dated July 7, 2005 (ML051530406).

RELIEF REQUEST PR-02

Proposed Alternative to Utilize Code Case OMN-18
In Accordance with 10 CFR 50.55a(a)(3)(i)

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1. ASME Code Component(s) Affected

AH-P-3A&B, Control Building Chilled Water Supply Pumps (Centrifugal / Group A / Class 3)
BS-P-1A&B, Reactor Building Spray Pumps (Centrifugal / Group AB / Class 2)
DC-P-1A&B, Decay Heat Closed Cooling Water Pumps (Centrifugal / Group A / Class 3)
DR-P-1A&B, Decay Heat River Water Pumps (Vertical Line Shaft / Group A / Class 3)
SF-P-1A&B, Spent Fuel Cooling Pumps (Centrifugal / Group A / Class 3)

Component/System Function

Provide minimum flow to meet system requirements under accident conditions.

2. Applicable Code Edition and Addenda

ASME OM Code-2004 Edition, with Addenda through OMb-2006

3. Applicable Code Requirement(s)

- ISTB-3300, "Reference Values," states, in part, that "reference values shall be established within ±20 percent of pump design flow rate for the comprehensive test," and "reference values shall be established within ±20 percent of pump design flow for the Group A and Group B tests, if practicable."
- ISTB-3400, "Frequency of Inservice Tests," states that an inservice test shall be run on each pump as specified in Table ISTB-3400-1.
- Table ISTB-3400-1 requires Group A and Group B tests to be performed quarterly and a Comprehensive Test to be performed biennially.
- Table ISTB-3510-1, "Required Instrument Accuracy," specifies the instrument accuracies for Group A, Group B, Comprehensive, and Preservice Tests.
- Table ISTB-5121-1, "Centrifugal Pump Test Acceptance Criteria," defines the required acceptance criteria for Group A, Group B, and Comprehensive Tests for centrifugal pumps.
- Table ISTB-5221-1, "Vertical Line Shaft Centrifugal Pumps Test Acceptance Criteria," defines the required acceptance criteria for Group A, Group B, and Comprehensive Tests for Vertical Line Shaft centrifugal pumps.

4. Reason for Request

The ASME Code committees have approved Code Case OMN-18, "Alternate Testing Requirements for Pumps Tested Quarterly within ± 20% of Design Flow." This Code Case has not been approved for use in Regulatory Guide 1.192, "Operation and Maintenance Code Case Acceptability, ASME OM Code," June 2003.

This Code Case allows the Owner to not perform the Comprehensive Pump Test (CPT) with the associated acceptance criteria, if the quarterly test is performed at ± 20% of design flow and the instrumentation meets the accuracy requirements of Table ISTB-3510-1 for the Comprehensive and Preservice Tests. The basis for the testing strategy in this Code Case is that a quarterly Group A pump test, performed at the CPT flow rate with more accurate instrumentation, is more effective in assessing a pump's operational readiness, through trending, than a standard Group A test in conjunction with a biennial CPT.

Additionally, ISTB allows the Owner to categorize the pumps in their program. As such, an Owner could categorize a pump that otherwise meets the requirements of Group B, as a Group A (or AB) pump, and test according to the provisions of Code Case OMN-18. In doing this, they are obtaining additional data (vibration and flow or differential pressure) quarterly, rather than once every two years.

As a result of the increased requirements on the parameters imposed by the proposed alternative during applicable quarterly tests, there is no added value in performing the biennial comprehensive test on the subject pumps.

5. Proposed Alternative and Basis for Use

TMI, Unit 1 is proposing to utilize the provisions of Code Case OMN-18 and performing a modified Group A test in lieu of performing the Code-required CPT. The modified Group A test will be run at ±20% of the pump's design flow rate using ±1/2% accurate gauges to determine the pump differential pressure. Vibration tests will be performed and the vibration acceptance criteria for the proposed alternative test will remain identical to the standard Group A test. Additionally, TMI, Unit 1 will utilize an Acceptable Range high limit of 106% or lower for quarterly testing, which is also consistent with the planned Code change applicable to CPT.

The use of more accurate pressure gauges and a more limiting Acceptable Range during every modified quarterly Group A test compensates for the elimination of the CPT (with its more limiting Acceptable Range upper bound for differential pressure or flow of 103%). Regular testing with more accurate instrumentation and tighter acceptance criteria will provide for better trending of pump performance. Instead of performing seven tests with pressure instruments with ±2% accuracy and then performing the eighth test with pressure instruments with ±1/2% accuracy, all eight tests will be performed with the same ±1/2% accurate instruments. Due to the improved accuracy, consistent testing methodology, and

the addition of quarterly vibration monitoring on Group AB pumps, deviations in actual pump performance indicative of impending degradation are more easily recognized during quarterly performance trending activities.

Using the provisions of this request as an alternative to the requirements of ISTB-3400 and Tables ISTB-3400-1, ISTB-5121-1, and ISTB-5221-1 provides a reasonable alternative to the Code requirements based on the determination that the proposed alternative will provide adequate indication of pump performance, permit detection of component degradation, and continue to provide an acceptable level of quality and safety. Therefore, pursuant to 10 CFR 50.55a(a)(3)(i), TMI, Unit 1 requests approval of this alternative to the specific ISTB requirements identified in this request.

6. Duration of Proposed Alternative

The proposed alternative identified will be utilized during the fifth IST interval which is scheduled to begin October 15, 2013 and conclude on October 14, 2023.

7. Precedents

A similar Relief Request (PR-01) was approved for the Oyster Creek Nuclear Generating Station as discussed in the U.S. Nuclear Regulatory Commission's Safety Evaluation Report dated June 21, 2012 (ML120050329).

A similar Relief Request (PR-9) was approved for the St. Lucie, Units 1 and 2 as discussed in the U.S. Nuclear Regulatory Commission's Safety Evaluation Report dated July 1, 2011 (ML11143A077).

A similar Relief Request (PR-3) was approved for the Perry Nuclear Power Plant, Unit 1 as discussed in the U.S. Nuclear Regulatory Commission's Safety Evaluation Report dated October 8, 2009 (ML092640690).

RELIEF REQUEST VR-02

10 CFR 50.55a RELIEF REQUEST: VR-02
Revision 0

Propose Alternative Concerning ASME OM Code Test Frequencies
In Accordance with 10 CFR 50.55a(a)(3)(ii)

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1. ASME Code Component(s) Affected

All Pumps and Valves contained within the Inservice Testing Program (IST) scope.

2. Applicable Code Edition and Addenda

ASME OM Code-2004 Edition, with Addenda through OMb-2006

3. Applicable Code Requirement(s)

This request applies to the frequency specifications of the ASME OM Code. The frequencies for tests given in the ASME OM Code do not include a tolerance band (grace period).

- ISTA-3120(a) - "The frequency for the inservice testing shall be in accordance with the requirements of Section IST."
- ISTB-3400 - "Frequency of Inservice Tests" - "An inservice test shall be run on each pump as specified in Table ISTB-3400-1." Table ISTB-3400-1 lists two frequencies – quarterly and biennially.
- ISTC-3510 - "Exercising Test Frequency" - "Active Category A, Category B, and Category C check valves shall be exercised nominally every 3 months, ..."
- ISTC-3540 - "Manual Valves" - "Manual Valves shall be full-stroke exercised at least once every 2 years, except where adverse conditions may require the valve to be tested more frequently to ensure operational readiness."
- ISTC-3630(a) - "Frequency" - "Tests shall be conducted at least once every 2 years."
- ISTC-3700 - "Position Verification Testing" - "Valves with remote position indicators shall be observed locally at least once every 2 years to verify that valve operation is accurately indicated."
- ISTC-5221(c)(3) - "At least one valve from each group shall be disassembled and examined at each refueling outage; all valves in a group shall be disassembled and examined at least once every 8 years."
- Appendix I, I-1320 - "Test Frequencies, Class 1 Pressure Relief Valves" - "Class 1 pressure relief valves shall be tested at least once every 5 years..."
- Appendix I, I-1330 - "Test Frequency, Class 1 Nonreclosing Pressure Relief Devices" - "Class 1 nonreclosing pressure relief devices shall be replaced every 5 years..."

- Appendix I, I-1340 - "Test Frequency, Class 1 Pressure Relief Valves that are used for Thermal Relief Application" - This section refers to I-1320 for test frequency.
- Appendix I, I-1350 - "Test Frequency, Classes 2 and 3 Pressure Relief Valves" - "Classes 2 and 3 pressure relief valves, with the exception of PWR main steam safety valves, shall be tested every 10 years, ..."
- Appendix I, I-1360 - "Test Frequency, Classes 2 and 3 Nonreclosing Pressure Relief Devices" - "Classes 2 and 3 nonreclosing pressure relief devices shall be replaced every 5 years, ..."
- Appendix I, I-1370 - "Test Frequency, Classes 2 and 3 Primary Containment Vacuum Relief Valves" - "Tests shall be performed on all Classes 2 and 3 containment vacuum relief valves at each refueling outage or every 2 years, ..."
- Appendix I, I-1380 - "Test Frequency, Classes 2 and 3 Vacuum Relief Valves Except for Primary Containment Vacuum Relief Valves" - "All Classes 2 and 3 vacuum relief valves shall be tested every 2 years, ..."
- Appendix I, I-1390 - "Test Frequency, Classes 2 and 3 Pressure Relief Devices that are used for Thermal Relief Application" - "Tests shall be performed on all Classes 2 and 3 relief devices used in thermal relief application every 10 years, ..."
- Appendix II, II-4000(a)(1)(e) - "Performance Improvement Activities" - Subparagraph (1)(e) requires the identification of the interval for each activity.
- Appendix II, II-4000(b)(1)(e) - "Optimization of Condition Monitoring Activities" - Subparagraph (1)(e) requires the identification of the interval for each activity.

4. Reason for Request

Pursuant to 10 CFR 50.55a(a)(3)(ii), an alternative is requested from the frequency specifications of the ASME OM Code. The basis of the relief request is that the Code requirement presents an undue hardship without a compensating increase in the level of quality or safety.

ASME OM Code Section IST establishes the inservice test frequency for all components within the scope of the Code. The frequencies (e.g., quarterly) have always been interpreted as "nominal" frequencies (generally as defined in the Table 3.2 of NUREG 1482, Revision 1) and Owners routinely applied the surveillance extension time period (i.e., grace period) contained in the plant Technical Specifications (TS) Surveillance Requirements (SRs). The TS typically allow for a less than or equal to 25% extension of the surveillance test interval to accommodate plant conditions that may not be suitable for conducting the surveillance. However, regulatory issues have been raised concerning the applicability of the TS "Grace Period" to ASME OM Code required inservice test frequencies.

The lack of a tolerance band (grace period) on the ASME OM Code inservice test frequency restricts operational flexibility. There may be a conflict where a surveillance

test could be required (i.e., its Frequency could expire), but where it is not possible or not desired that it be performed until sometime after a plant condition or associated Technical Specification is applicable. Therefore, to avoid this conflict, the surveillance test should be performed when it can be and should be performed.

The NRC recognized this potential issue in the TS by allowing a frequency tolerance as described in the TMI, Unit 1 TS SR 4.0.1. The lack of a similar tolerance applied to OM Code testing places an unusual hardship on the plant to adequately schedule work tasks without operational flexibility.

Thus, just as with TS required surveillance testing, some tolerance is needed to allow adjusting OM Code testing intervals to suit the plant conditions and other maintenance and testing activities. This assures operational flexibility when scheduling surveillance tests that minimize the conflicts between the need to complete the surveillance and plant conditions.

5. Proposed Alternative and Basis for Use

ASME OM Code establishes component test frequencies that are based either on elapsed time periods (e.g., quarterly, 2 years, etc.) or on the occurrence of plant conditions or events (e.g., cold shutdown, refueling outage, upon detection of a sample failure, following maintenance, etc.).

a. Components whose test frequencies are based on elapsed time periods shall be tested at the frequencies specified in ASME OM Code Section IST with a specified time period between tests as shown in the table below and as defined in TMI, Unit 1 TS Section 1.25.

b. The specified time period between tests may be reduced or extended as follows:

   1) For periods specified as less than 2 years, the period may be extended by up to 25% for any given test. This is consistent with TMI, Unit 1 TS Section 1.25, "FREQUENCY NOTATION."

   2) For periods specified as greater than or equal to 2 years, the period may be extended by up to 6 months for any given test.

   3) All periods specified may be reduced at the discretion of the owner (i.e., there is no minimum period requirement).

   4) Period extensions may also be applied to accelerated test frequencies (e.g., pumps in Alert Range).

Frequency	Specified Time Period Between Tests (all values are 'not to exceed'; no minimum periods are specified)
Quarterly (or every 3 months)	92 days
Semiannually (or every 6 months)	184 days
Annually (or every year)	366 days
x Years	x calendar years where 'x' is a whole number of years ≥ 2

c. Components whose test frequencies are based on the occurrence of plant conditions or events (e.g., cold shutdown, refueling outage, upon detection of a sample failure, following maintenance, etc.) may not have their period between tests extended except as allowed by the ASME OM Code.

Period extension is to facilitate test scheduling and considers plant operating conditions that may not be suitable for performance of the required testing (e.g., performance of the test would cause an unacceptable increase in the plant risk profile due to transient conditions or other ongoing surveillance test or maintenance activities). Period extensions are not intended to be used repeatedly merely as an operational convenience to extend test intervals beyond those specified. This request is not applicable to frequencies in Subsection ISTD.

Using the provisions of this request as an alternative to the specific frequency requirements of the OM Code identified above will provide operational flexibility and still continue to provide an acceptable level of quality and safety. Therefore, pursuant to 10 CFR 50.55a(a)(3)(ii), TMI, Unit 1 requests approval of the alternative to the specific OM Code frequency requirements identified in this request.

6. Duration of Proposed Alternative

The proposed alternative identified will be utilized during the fifth IST interval which is scheduled to begin October 15, 2013 and conclude on October 14, 2023.

7. Precedents

A similar Relief Request was submitted to the U.S. Nuclear Regulatory Commission for Quad Cities Nuclear Power Station, Units 1 and 2 for the fifth 10-year interval, as documented in Letter RS-12-026 dated February 15, 2012.

8. References

TMI, Unit 1 TS Section 1.25 - "FREQUENCY NOTATION"
TMI, Unit 1 TS Section 4.2 - "Reactor Coolant System Inservice and Testing"