July 7, 2005

Mr. Christopher M. Crane
President and Chief Executive Officer
AmerGen Energy Company, LLC
4300 Winfield Road
Warrenville, IL 60555

SUBJECT: THREE MILE ISLAND NUCLEAR STATION, UNIT 1 (TMI-1), RELIEF REQUESTS FOR THE PUMP AND VALVE INSERVICE TESTING (IST) PROGRAM (TAC NO. MC2558)

Dear Mr. Crane:

By letter dated March 26, 2004, as supplemented July 19, 2004, January 28 and April 27, 2005, AmerGen Energy Company, LLC (the licensee), requested pump reliefs (PRs) PR-01, PR-02, PR-03 and PR-04, and valve reliefs (VRs) VR-01 and VR-02 for TMI-1. The licensee requested relief from the IST requirements of the American Society of Mechanical Engineers, *Operations and Maintenance of Nuclear Power Plants*, Code (ASME OM Code), 1998 edition through 2000 addenda. The licensee's July 19, 2004, and January 28, 2005, letters provided additional information for PR-03, and for PR-01 and PR-02, respectively, and the April 27, 2005, letter provided a revised PR-02.

The Nuclear Regulatory Commission staff has completed its review of the relief requests, as discussed in the enclosed Safety Evaluation. Pursuant to Title 10 of the *Code of Federal Regulations,* Part 50, Section 50.55a(a)(3)(i), relief requests PR-02, PR-04, VR-01 and VR-02 are authorized on the basis that the proposed alternatives provide an acceptable level of quality and safety. The licensee's approach of performing a comprehensive pump test meets the intent of the OM Code for PR-03; and, therefore, relief from OM Code requirements is unnecessary. As discussed with your staff and in the enclosed Safety Evaluation, the NRC staff cannot approve PR-01 at this time. Should the licensee obtain additional supporting information for PR-01, it may resubmit its request at a later date.

If you have any questions, please contact the TMI-1 Project Manager, Mr. Peter S. Tam, at (301) 415-1402.

Sincerely,

/RA by P. Milano/

Richard J. Laufer, Chief, Section 1
Project Directorate I
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

Docket No. 50-289

Enclosure: Safety Evaluation

cc w/encl: See next page

If you have any questions, please contact the TMI-1 Project Manager, Mr. Peter S. Tam, at (301) 415-1402.

Sincerely,

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*Safety evaluation transmitted by memo of 5/10/05.

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO THREE MILE ISLAND NUCLEAR STATION, UNIT 1 (TMI-1)

REQUEST FOR RELIEF FROM INSERVICE TESTING (IST) REQUIREMENTS

FOR PUMPS AND VALVES (PR-01, PR-02, PR-03, PR-04, VR-01, AND VR-02)

FOR THE FOURTH 10-YEAR IST INTERVAL

AMERGEN ENERGY COMPANY, LLC

DOCKET NO. 50-289

1.0 INTRODUCTION

By letter dated March 26, 2004, (Ref. 1), AmerGen Energy Company, LLC (AmerGen or the licensee) submitted four pump relief (PR) requests (PR-01, PR-02, PR-03 and PR-04) and two valve relief (VR) requests (VR-01 and VR-02) for Three Mile Island Nuclear Station, Unit 1 (TMI-1). AmerGen requested relief from certain IST requirements of the American Society of Mechanical Engineers, *Operations and Maintenance of Nuclear Power Plants*, Code (ASME OM Code), 1998 edition through 2000 addenda. In a subsequent letter dated July 19, 2004 (Ref. 2), additional information was submitted for PR-03. In response to the Nuclear Regulatory Commission (NRC) staff's request for additional information dated December 15, 2004 (Ref. 3), for PR-01 and PR-02, the licensee revised relief request PR-02 in its letter dated April 27, 2005 (Ref. 5). During a conference call on April 8, 2004, the licensee indicated that additional information for relief request PR-01 may be submitted at a later date. The NRC staff indicated that it could not approve PR-01 as currently requested.

2.0 REGULATORY EVALUATION

Title 10 of the *Code of Federal Regulations*, Section 50.55a (10 CFR 50.55a), requires that IST of certain ASME Code, Class 1, 2, and 3 pumps and valves be performed in accordance with the ASME OM Code and applicable addenda, except when alternatives have been authorized or relief has been requested by the licensee and granted by the Commission pursuant to 10 CFR 50.55a(a)(3)(i), 10 CFR 50.55a(a)(3)(ii), or 10 CFR 50.55a(f)(6)(i). In proposing alternatives or requesting relief, the licensee must demonstrate that: (1) the alternatives will provide an acceptable level of quality and safety, (2) compliance would result in hardship or unusual difficulty without a compensating increase in the level of quality and safety, or (3) conformance would be impractical for its facility. The regulations in 10 CFR 50.55a authorize the Commission to approve alternatives and to grant relief from ASME Code requirements upon making the necessary findings. NRC guidance contained in Generic Letter (GL) 89-04, "Guidance on Developing Acceptable Inservice Testing Programs," provides alternatives to Code requirements which are acceptable to the NRC staff. Further guidance is given in GL 89-04, Supplement 1, and NUREG-1482, "Guidance for Inservice Testing at Nuclear Power

Plants." The licensee has requested the reliefs be effective for the remainder of the fourth 10-year IST interval.

For the fourth 10-year IST interval, the licensee's Code of record for pump and valve IST is the 1998 edition through the 2000 addenda of the ASME OM Code for pump and valve IST. The NRC staff has completed its review of relief requests PR-2, PR-03, PR-04, VR-01 and VR-02, and its findings with respect to authorizing alternatives and granting the requested IST relief are given below.

3.0 TECHNICAL EVALUATION

3.1 Pump Relief Request PR-01

The licensee has requested relief for its Nuclear Service River Water pumps NR-P1A, -P1B, and -P1C, from the requirements of ISTB-5221 and ISTB-3400-1 of the 1998 edition through 2000 addenda of the ASME OM Code. ISTB-5221 requires that the pump flow rate be measured during the group A pump test. Table ISTB-3400-1 requires a comprehensive pump test (CPT) to be performed biennially for Group A pumps.

3.1.1 Licensee's Basis for the Relief Request

The licensee states:

> Pursuant to 10 CFR 50.55a(f)(5)(iii), relief is request from the requirements of ASME OM Code ISTB-5221(b) and ISTB Table ISTB-3400-1. Due to system design and plant operating requirements, individual pump flow rate cannot be measured during the Group A test as required by ISTB-5221(b).
>
> 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, strainer and elbow configuration on the discharge of the pumps. TMI has investigated individual annubar instrumentation for this configuration; however, the accuracy and repeatability of using individual annubar instrumentation has not produced results to meet IST instrument requirements.
>
> Since the refueling cycle for the Three Mile Island is normally two years, a situation may exist where the plant may be required to shut down in order to perform the biennial Comprehensive Pump Test on the subject pumps. In the event of an extended intermediate outage, the biennial frequency (once every two years) may be exceeded. Therefore, an alternative is also requested in accordance with 10 CFR 50.55a(a)(3)(i) to perform the comprehensive pump test on a refueling outage frequency, which will avoid the potential for an unnecessary plant shutdown while testing to a biennial frequency.
>
> The TMI Technical Specifications define Refueling Outage Interval as 24 months. Additionally, Technical specification 1.25 provides an interval extension

of 25% for cycle lengths, which exceed the 24 months. Therefore, the proposed alternative will be similar to the TMI Technical Specifications.

3.1.2 Alternative Testing

The licensee states:

a. TMI will continue to perform quarterly testing using a modified Group A test procedure. With two pumps in service, the required Group A test parameters will be measured except for flow rate. During this test the differential pressure will be throttled to the reference value. Vibration measurements will then be recorded and compared to their reference values. Deviations from the reference value will be compared with the ranges specified in Table ISTB-5200-1 for Group A tests. Corrective actions will be taken in accordance with ISTB-6200.

b. Each of the subject pumps will be tested individually in accordance with ISTB-5223, Comprehensive Test Procedure during refueling outages.

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

d. The comprehensive pump test will be performed on a refueling outage frequency, which will avoid the potential for an unnecessary plant shutdown while testing to a biennial frequency.

3.1.3 Evaluation

ISTB-5121(b) of the ASME OM Code requires that an inservice test be conducted for Group A centrifugal pumps quarterly. During this test, the Code requires that the resistance of the system be varied until the flow rate equals the reference value, then the differential pressure be determined and compared to its reference value; alternatively, the flow rate be varied until the differential pressure equals the reference point and the flow rate determined and compared to the reference flow rate value. It is very clear that two test parameters (one fixed and one variable) are required to determine pump hydraulic performance degradation.

The licensee proposes to measure only ΔP, i.e., throttle the flow until a predetermined ΔP value is reached. The licensee considered the test acceptable if the predetermined ΔP value is reached. However, the staff does not find the proposed alternative acceptable, because the measured ΔP even for a severe degraded pump could be adjusted to meet the predetermined ΔP value by varying the system resistance. Therefore, to assess pump hydraulic performance degradation, an additional variable such as flow rate must be determined and compared to its reference value. During a conference call on April 8, 2004, the NRC staff discussed the concern with the licensee, and the licensee indicated that additional information for relief request PR-01 may be submitted at a later date. The NRC staff cannot approve PR-01 at this time. Should the licensee obtain additional supporting information for PR-01 it may resubmit its request at a later date.

3.2 Pump Relief Request PR-02

The licensee has requested relief for its nuclear service closed cooling water (NSCCW) pumps NS-P-1A, -1B and -1C from the requirements of ISTB-5121(b) and Table ISTB-3400-1 of the 1998 edition through 2000 addenda of the ASME OM Code. ISTB-5121(b) requires that individual pump flow rate be measured during the Group A pump test. Table ISTB-3400-1 requires a comprehensive pump test be performed biennially for Group A pumps.

3.2.1 Licensee's Basis for the Relief Request

The licensee states:

> Pursuant to 10 CFR 50.55a(f)(5)(iii), relief is requested from the requirements of ASME OM Code ISTB-5121(b) and ISTB Table ISTB-3400-1.
>
> 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 as required by ISTB-5121(b). 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 flowrate. 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.
>
> Since the refueling cycle for Three Mile Island is nominally two years, a situation may exist where the plant may be required to shut down in order to perform the biennial Comprehensive Pump Test on the subject pumps. In the event of an extended intermediate outage, the biennial frequency (once every two years) may be exceeded. Therefore, an alternative is requested in accordance with 10 CFR 50.55a(a)(3)(i) to perform the comprehensive pump test on a refueling outage frequency, which will avoid the potential for an unnecessary plant shutdown while testing to a biennial frequency.
>
> The TMI Technical Specifications define Refueling Outage Interval as 24 months. Additionally, Technical Specification 1.25 provides an interval extension of 25% for cycle lengths, which exceed the 24 months. Therefore, the proposed alternative will be similar to the TMI Technical Specifications.

3.2.2 Alternative Testing

The licensee states:

> 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 inservice 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.
>
> The proposed test would test 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 inservice to provide adequate cooling for system components. The NSCCW pumps are centrifugal pumps (not vertical line shaft). The current quarterly inservice test tests all combination 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 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 compared to the Code acceptance criteria. Therefore, this testing method provides an acceptable level in quality and safety for determining pump performance.
>
> As proposed alternatives:
>
> a. TMI 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.
>
> Vibration measurements will then be recorded and compared to their reference values. Deviations from the reference value will be compared with the ranges specified in Table ISTB-5200-1 for Group A tests. Corrective actions will be taken in accordance with ISTB-6200.
>
> b. Each of the subject pumps will be tested individually in accordance with ISTB-5123, Comprehensive Test Procedure during refueling outages.

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

d. The comprehensive pump test will be performed on a refueling outage frequency, which will avoid the potential for an unnecessary plant shutdown while testing to a biennial frequency.

3.2.3 Evaluation

3.2.3.1 Relief from ISTB-5121(b)

ISTB-5121(b) of the ASME OM Code requires that IST be conducted for Group A centrifugal pumps quarterly. During this testing, the Code requires that either the pump flow or differential pressure shall be varied until fixed values are reached. After the pump hydraulic and vibration values stabilize and the required 2-minute run time is completed, the variable hydraulic value is then recorded and compared with the acceptance criteria to determine pump degradation.

The three NSCCW pumps are centrifugal pumps. The flow instrumentation for this system is located in the common discharge header for all three of the subject pumps. 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. The licensee states that 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. Compliance with the ASME OM Code requirement to measure individual pump flow rate would require installation of new piping or certain system modification and would impose a hardship on the licensee. As such, the licensee requests relief from the quarterly requirements of individual flow measurement, and proposes to calculate the individual pump flow rate from the combined flow measurements of three paired-pump tests (A-B, B-C, A-C). The calculated individual pump flow rates will be compared against individual pump flow rate calculated reference values. The pumps will continue to be tested individually in accordance with ISTB-5123, Comprehensive Pump Test (CPT) Procedure, during refueling outages. In addition, for the quarterly test and CPT, TMI-1 will also perform a full spectrum vibration analysis for the affected pumps.

The NRC staff finds that the method of calculating the individual flow rate from three paired-pump tests (A-B, B-C, A-C) provides equally acceptable results of flow rates for each affected pump as opposed to individually measured flow rates. On the basis that direct measurements of the individual pump flow rate is not practical, and that the quarterly Group A test is primarily a qualitative test to detect gross mechanical or hydraulic failures, the staff concludes that the proposed alternative of detecting gross hydraulic failure using the calculated flow rates for quarterly tests provides reasonable assurance of pump operability.

3.2.3.2 Relief from Table ISTB-3400-1

Table ISTB-3400-1 requires a CPT to be performed biennially for Group A pumps. The licensee requests relief from the biennial test requirements and proposes to perform the test each refueling outage.

Because the individual pump flow rates could not be measured accurately during operation, the CPT for the affected pumps can only be performed during a plant shutdown or refueling outage. As defined in the Technical Specifications (TSs), the refueling cycle for TMI-1 is nominally two years (24 months). However, TMI-1 TS 1.25 allows a 25% maximum frequency extension for operational considerations that also applies to the refueling intervals. To comply with the biennial test requirement, a situation such as an extended intermediate outage may exist where the plant is required to shut down in order to perform the CPT on the affected pumps. As such, the licensee proposes to perform the CPT each refueling outage. The proposed refueling test frequency may cause the CPT test interval to exceed 2 years during certain extended outages, but the increase would not be detrimental to the pump's operational readiness (# 25%) and is consistent with the TMI-1 TSs. Therefore, the NRC staff finds that the proposed alternative provides an acceptable level of quality and safety for the subject pumps.

3.2.4 Conclusion

Pursuant to 10 CFR 50.55a(a)(3)(i), the alternative is authorized on the basis that it provides an acceptable level of quality and safety.

3.3 Pump Relief Request PR-03

The licensee has requested relief for its turbine-driven emergency feedwater (TDEF) pump, EF-P-1, from the requirements of ISTB-3300(e)(1) of the 1998 edition through 2000 addenda of the ASME OM Code. ISTB-3300(e)(1) requires that reference values shall be established with ± 20% of the pump design flow rate for the comprehensive test.

3.3.1 Licensee's Basis for Requesting Relief

In its basis for relief, the licensee states, "relief is requested from ISTB-3300(e)(1) in meeting the specified ± 20% of design flow (736 gpm [920 gpm x 80%]) during the CPT. The specified ± 20% of pump design flow rate can not be achieved for the subject pump during CPT without introducing large volumes of highly oxygenated water into the once-through-steam generators which increases the potential for corrosion of the steam generators. The manufacturer's design flow rate of the TDEF pump is 920 gpm at 2750 feet of developed head."

3.3.2 Alternate Testing

The licensee proposes that the CPT reference flow be established at 500 gpm; approximately 54% of manufacture's pump design flow.

3.3.3 Evaluation

The TMI-1 TDEF pump falls within the scope of the ASME OM Code, is defined as a Group B pump, and, therefore, is subject to quarterly Group B tests and a biennial CPT. Pump speed as well as differential pressure or flow rate are required to be monitored for the Group B test for the emergency feedwater pumps. Additionally, speed, differential pressure, flowrate, discharge pressure and vibration are required for the comprehensive test. ISTB 3300(e)(1) of the ASME OM Code requires the establishment of reference values for the CPT to be within ± 20% of pump design flow.

The CPT, which first appeared in the 1995 edition of the ASME OM Code, results in a more accurate assessment of the pump's operational readiness and performance characteristics at a reduced frequency (once-every-refueling-cycle versus once-every-3-months). The test is intended to be conducted at or near a pump's design flow rate because this area of the pump curve is considered to be most representative of the pump's design performance characteristics. The quarterly Group A or B test is primarily a qualitative test to detect gross mechanical or hydraulic failures and not to assess hydraulic performance capabilities or to detect minor imbalances through vibration measurements.

The CPT provides a technically sound evaluation and reliable assessment of the pump's operational readiness and performance characteristics under design-basis accident conditions. This evaluation and assessment of design performance provides reasonable assurance that the emergency feedwater system will accomplish its safety-related functions. However, the ASME OM Code does not define design flow.

Although there has been much discussion about the meaning of the term "pump design flow rate" as used in paragraph ISTB-3300(e) of the ASME OM Code, the NRC staff considers the pump design flow rate to be the licensed design-basis flow rate at the required total developed head (TDH). That is, the range of flows assumed in the accident analysis or committed to in a licensing document. The intent of the Group A and Group B Tests is to monitor for degradation. The intent of the CPT is to verify design-basis capability.

In its current configuration, EF-P-1 is tested using each refueling outage by injecting water from the condensate storage tanks into a steam generator. The steam generator is depressurized during this test. The test is currently run at two test points, 290 gpm, representing a minimum accident required flow rate, and at 500 gpm, a point reasonably obtainable and repeatable on the sloped portion of the pump curve. As shown by the licensee, EF-P-1 can be tested within the range of flows defined by their design and licensing bases. As such, the current testing program meets the intent of ASME OM Code, paragraph ISTB 3300(e)(1).

3.3.4 Conclusion

The NRC staff finds that the current approach detailed by the licensee in its response to the NRC staff's request for additional information (Ref. 2) meets the intent of the ASME OM Code. Therefore, the licensee's request for relief, PR-03, is unnecessary.

3.4 Pump Relief Request PR-04

The licensee has requested relief for its decay heat removal (DHR) pumps DH-P-1A, and -1B from the requirements of ISTB-1400 of the 1998 edition through 2000 addenda of the ASME OM Code. ISTB-1400 requires that a pump that meets both Group A and Group B definitions shall be categorized as a Group A pump.

3.4.1 Licensee's Basis for the Relief Request

The licensee states:

> Pursuant to 10 CFR 50.55a, "Codes and Standards," paragraph (a)(3)(ii), relief is requested from the requirement of ASME OM Code ISTB-1400(b). This relief will result in testing the Decay Heat Removal pumps as Group B during power operations versus Group A. This proposed relief will result in a lower potential for pump degradation due to pump wear while still being capable of measuring pump performance. The basis of the relief request is that the proposed alternative would provide an acceptable level of quality and safety.
>
> The Decay Heat Removal pumps meet the categorization of group A pumps in that they are operated routinely during plant shutdowns and refueling outages. However, these pumps also meet the requirements of group B, in that during normal operation (reactor critical) they are not operated except for testing.
>
> During normal power operations, the Decay Heat Removal pump is in a standby condition and is considered an essential part of the Emergency Core Cooling System (ECCS). The pump starts automatically upon receipt of a safety injection signal taking suction from the Borated Water Storage Tank during the injection phase of an accident. The pump is then aligned to take suction from the containment sump during the recirculation phase of an accident. The pump discharges to the reactor coolant system via the decay heat removal heat coolers.
>
> ASME ISTB-1400(b) states that if a pump meets both group A and group B definitions, it shall be categorized as a group A pump. The Decay Heat Removal pumps are currently tested during normal operation, using the minimum flow recirculation loop. This test is similar to a group B test in that the pump is operated at low flow conditions (approximately 850 gpm).
>
> The design flow rate of the Decay Heat Removal Pumps is 3000 gpm. This flow rate can only be achieved during shutdown periods when injection into the reactor coolant system at a reduced pressure is possible.
>
> Classifying these pumps as group B during power operation minimizes the time required to perform quarterly testing. The 1998/2000 ASME Code testing requirements eliminate the two-minute minimum pump run-time for quarterly group B tests. Eliminating the minimum pump run-time requirement and the requirement to record differential pressure and vibration levels is expected to

slightly reduce the length of each quarterly pump test and the accompanying unavailability time for these pumps. Since these pumps are not operated routinely during plant operation, except for required surveillance testing, there is no time- or wear-related degradation mechanism that would warrant performing more detailed quarterly tests on DH-P-1A/B.

NUREG/CP-0137, Vol. 1, Proceedings of the Third NRC/American Society of Mechanical Engineers (ASME) Symposium on Valve and Pump Testing, includes a paper entitled, "Description of Comprehensive Pump Test Change to ASME Code, Subsection ISTB." This paper details the philosophy of classifying pumps as group A or group B. According to the author, the intent of having different test requirements for different pump groups is to relate the requirements for the amount and degree of quarterly performance monitoring to the amount of degradation expected based on pump operation.

Testing the decay heat removal pumps quarterly as group A pumps during power operation is contrary to the philosophy of the referenced paper. Quarterly group A testing subjects these pumps to increased test requirements and performance monitoring. Also, this testing introduces the potential for more degradation due to pump wear (caused by low-flow operation) at the time when they are standby pumps and would not otherwise be subject to operation-induced degradation. Group A testing during power operation may be more detrimental to the long-term health of these components than Group B testing.

3.4.2 Alternative Testing

The licensee states:

TMI proposes that the decay heat removal pumps (DH-P-1A and DH-P-1B) be tested as standby pumps (group B) during power operation and as continuously operating pumps (group A) during refueling operations. During refueling operations, the comprehensive pump test may be substituted for a quarterly group A test that comes due. TMI further proposes that at any time a comprehensive pump test is performed, the Code-required quarterly low-flow test (group B) requirement may be deleted for that quarter.

3.4.3 Evaluation

ISTB-2000 defines pumps that are operated continuously or routinely during normal operation, cold shutdown, or refueling operations, as Group A pumps, and pumps in standby systems that are not operated routinely except for testing as Group B pumps. ISTB-1400(b) requires that a pump that meet both Group A and Group B definitions shall be categorized as a Group A pump.

The DHR pumps clearly meet the definition of Group A pumps in that they are operated routinely during plant shutdowns and refueling outages. However, these pumps also meet the requirements of Group B, in that during normal operation they are not operated except for testing. According to ISTB-1400(b), these DHR pumps should be categorized as Group A pumps and tested in accordance with ISTB-5100 and ISTB-5120. However, these DHR pumps cannot be tested as Group A pumps because these pumps are standby pumps, and they can

only be tested during operation utilizing the minimum-flow recirculation line as Group B pumps. The licensee also states that since these pumps are not operated routinely during plant operation, except for required surveillance testing, there is no time- or wear-related degradation mechanism that would warrant performing more detailed quarterly tests on DH-P-1A/B.

In GL 89-04, Position 9, the NRC determined that, in cases where flow can only be established through a non-instrumented, minimum-flow path during quarterly pump testing, and a path exists at cold shutdown or refueling outages to perform a test of the pump under full or substantial flow conditions, the increased interval for flow measurement is an acceptable alternative to the Code requirements. Therefore, the NRC staff finds that the proposed alternative testing of the DHR pumps as Group B during operation, and as Group A during refueling outage is consistent with GL 89-04, Position 9, and provides reasonable assurance of operational readiness of the affected pumps.

3.4.4 Conclusion

Pursuant to 10 CFR 50.55a(a)(3)(i), the alternative is authorized on the basis that it provides acceptable level of quality and safety.

3.5 Valve Relief Request VR-01

The licensee has requested relief for the non-containment isolation valves MU-V-14A/B, MU-V-112, CF-V-4A/B, CF-V-5A/B, NR-V-2, NR-V-4A/B, and NR-V-6 from the frequency requirements of ISTC-3630(a) of the 1998 edition through 2000 addenda of the ASME OM Code. ISTC-3630(a) requires that a leak test be performed at least every 2 years.

3.5.1 Licensee's Basis for the Relief Request

The licensee states:

> Pursuant to 10 CFR 50.55a, "Codes and Standard," paragraph (a)(3)(i), relief is requested from the requirement of ASME OM Code ISTC-3630(a). ISTC-3630(a) requires a leak test to be performed at least once every two (2) years. TMI proposes to test these valves on a refueling outage frequency in order to avoid an unnecessary shutdown. The basis for the relief request is that the proposed alternative would provide an acceptable level of quality and safety.
>
> The subject valves are all categorized as A or A/C since they have a seat leakage requirement to fulfill their specific function in the closed direction. These valves are not containment isolation valves.
>
> Leakage testing on the subject valves is performed during refueling outages when the associated systems can be removed from service.
>
> Since the refueling cycle for Three Mile Island is nominally two years, a situation may exist where the plant may be required to shut down in order to perform the leakage test using the two (2) year frequency defined in the code. Therefore, an alternative is requested in accordance with 10 CFR 50.55a(a)(3)(i) to perform the

leakage test on a refueling outage frequency, which will avoid the potential for an unnecessary plant shutdown while testing to a two (2) year frequency.

The TMI Technical Specifications define Refueling Outage interval as 24 months. Additionally, Technical Specification 1.25 provides an interval extension of 25% for cycle lengths, which exceed the 24 months. Therefore, the proposed alternative will be similar to the TMI Technical Specifications.

3.5.2 Alternative Testing

The licensee states:

The seat leakage test for the subject valves will be performed each refueling outage.

3.5.3 Evaluation

ISTC-3630(a) requires that a leak test be performed at least every 2 years. The licensee requests relief from the 2-year test requirement and proposes to perform the leakage test each refueling outage.

The licensee indicates that the Code-required 2-year leakage test for the subject valves can only be performed during a plant shutdown or refueling outage. As defined in the TMI-1 TSs, the refueling cycle for TMI-1 is nominally 2 years (24 months). However, TMI-1 TS 1.25 allows a 25% maximum frequency extension for operational considerations that also applies to the refueling intervals. To comply with the 2-year test requirement, following a situation such as an extended intermediate outage, the plant may be required to shut down in order to perform the leakage test on the subject valves. To prevent this situation, the licensee proposes to perform the leakage test each refueling outage. The proposed refueling test frequency may cause the test interval to exceed 2 years during certain extended outages, but the increase would be insignificant (# 25%) and is consistent with TMI-1 TSs. Therefore, the NRC staff finds that the proposed alternative provides an acceptable level of quality and safety for the subject valves.

3.5.4 Conclusion

Pursuant to 10 CFR 50.55a(a)(3)(i), the alternative is authorized on the basis that it provides an acceptable level of quality and safety.

3.6 Valve Relief Request VR-02

The licensee has requested relief from the frequency requirements of ISTC-3700 for position verification for the valves listed below.

AH-V-1A thru D	CM-V-2	HM-V-1A/B	IC-V-6
CA-V-4A/B	CM-V-3	HM-V-2A/B	MS-V-1A thru D
CA-V-5A/B	CM-V-4	HM-V-3A/B	MS-V-2A/B
CA-V-189	DH-V-1	HM-V-4A/B	MU-V-2A/B
CF-V-1A/B	DH-V-2	HR-V-22A/B	MU-V-3
CF-V-2A/B	DH-V-4A/B	HR-V-23A/B	MU-V-14A/B
CF-V-19A/B	DH-V-5A/B	IC-V-2	MU-V-16A thru D
CF-V-20A/B	DH-V-6A/B	IC-V-3	MU-V-18
CM-V-1	EF-V-2A/B	IC-V-4	MU-V-20

MU-V-25	NS-V-15	RC-V-28	RR-V-5
MU-V-26	NS-V-35	RC-V-40A/B	RR-V-10A/B
MU-V-36	NS-V-52A/B/C	RC-V-41A/B	WDG-V-3
MU-V-37	NS-V-53A/B/C	RC-V-42	WDG-V-4
NR-V-1A/B/C	RB-V-2A	RC-V-43	WDL-V-303
NR-V-2	RB-V-7	RC-V-44	WDL-V-304
NR-V-4A/B	RC-V-2	RR-V-1A/B	WDL-V-534
NR-V-6	RC-RV-2	RR-V-3A/B/C	WDL-V-535
NS-V-4	RC-V-4	RR-V-4A thru D	

3.6.1 Licensee's Basis for the Relief Request

The licensee states:

> Pursuant to 10 CFR 50.55a, "Codes and Standards," paragraph (a)(3)(i), relief is requested from the requirement of ASME OM Code ISTC-3700. The basis of the relief request is that the proposed alternative would provide an acceptable level of quality and safety.
>
> The subject valves are power-operated valves with remote position indication. To perform the remote position verification, the valve must be cycled from normal position (open or closed) to the full stroke position. Local observation of the valve position is verified with remote position indication at least once every 2 years. The valve is then cycled to its normal position. Local observation of the valve is then verify again to match the remote position indication.
>
> The subject valves listed are in systems or portions of a system, which typically cannot be isolated during normal power operations or cold shutdowns. Additionally, many of these valves are inside the reactor building and would require a containment entry to verify local position.
>
> Since the refueling cycle for Three Mile Island is nominally two years, a situation may exist where the plant may be required to shut down in order to perform the 2 year position indication verification on these subject valves. In the event of an extended intermediate outage, the two year frequency may be exceeded. Therefore, an alternative is requested in accordance with 10 CFR 50.55a(a)(3)(i) to perform the verification on a refueling outage frequency, which will avoid the

> potential for an unnecessary plant shutdown while testing to a two (2) year frequency. The TMI Technical Specifications define Refueling Outage interval as 24 months. Additionally, Technical Specification 1.25 provides an interval extension of 25% for cycle lengths, which exceed the 24 months. Therefore, the proposed alternative will be similar to the TMI Technical Specifications.

3.6.2 Alternative Testing

The licensee states:

> The position indication verification test as described above for the subject valves will be performed each refueling outage.

3.6.3 Evaluation

ISTC-3700 requires that valves with remote position indicators be observed locally at least once every 2 years to verify that valve operation is accurately indicated. The licensee requests relief from the 2-year test requirement and proposes to perform the verification test each refueling outage.

The subject valves are power-operated valves with remote position indication. To perform the remote position verification, the valve must be cycled from normal position (open or closed) to the full-stroke position. Local observation of the valve position is verified with remote position indication. The valve is then cycled to its normal position. Local observation of the valve is then verified again to match the remote position indication. The subject valves listed are in systems or portions of a system, which typically cannot be isolated during normal power operation or cold shutdowns. Additionally, many of these valves are inside the reactor building and would require a containment entry to verify local position. Because the Code-required verification test for the affected valves can only be performed during a plant shutdown or a refueling outage, the licensee proposes to perform the verification test each refueling outage.

As defined in the TMI-1 TSs, the refueling cycle for TMI-1 is nominally 2 years (24 months). However, TMI-1 TS 1.25 allows a 25% maximum frequency extension for operational considerations that also applies to the refueling intervals. To comply with the 2-year test requirement, a situation such as an extended intermediate outage could occur whereby the plant is required to shut down prior to the scheduled refueling outage in order to perform the required test. To prevent this situation, the licensee proposes to perform the verification test each refueling outage. The proposed refueling test frequency may cause the verification test interval to exceed 2 years during certain extended outages, but the increase would be insignificant (# 25%) and is consistent with the TMI-1 TSs. Therefore, the NRC staff finds that the proposed alternative provides an acceptable level of quality and safety for the subject valves.

3.6.4 Conclusion

Pursuant to 10 CFR 50.55a(a)(3)(i), the alternative is authorized on the basis that it provides acceptable level of quality and safety.

4.0 CONCLUSION

Pursuant to 10 CFR 50.55a(a)(3)(i), relief requests PR-02, PR-04, VR-01 and VR-02 are authorized on the basis that the proposed alternatives provide an acceptable level of quality and safety. For relief request PR-03, the licensee's approach to performing the comprehensive pump test meets the intent of the Code, and therefore, the request for relief is unnecessary. The NRC staff cannot approve relief request PR-01 at this time; should the licensee obtain additional supporting information, it may resubmit this request at a later date.

5.0 REFERENCES

1. Letter from Michael P. Gallagher, AmerGen, to NRC, "Submittal of a Request for Relief to the Requirements of 10 CFR 50.55a Concerning [the] Fourth Ten-Year Interval Inservice Testing Program," dated March 26, 2004.

2. Letter from Michael P. Gallagher, AmerGen, to NRC, "Response to Request for Additional Information Concerning Relief Request PR-03 for the Fourth Ten-Year Interval Inservice Testing Program," dated July 19, 2004.

3. Letter from Timothy G. Colburn, NRC, to C.M. Crane, "Request for Additional Information for Relief Requests PR-01 and PR-02," dated December 15, 2004.

4. Letter from David P. Helker, AmerGen, to NRC, "Response to Request for Additional Information Concerning Relief Requests PR-01 and PR-02 for the Fourth Ten-Year Interval Inservice Testing Program," dated January 28, 2005.

5. Letter from Pamela B. Cowan, AmerGen, to NRC, "Additional Information Concerning Relief Request PR-02 for the Fourth Ten-Year Interval Inservice Testing Program," dated April 27, 2005.

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