June 27, 2003

Mr. John L. Skolds, Chairman
and Chief Executive Officer
AmerGen Energy Company, LLC
4300 Winfield Road
Warrenville, Illinois 60555

SUBJECT: CLINTON POWER STATION, UNIT 1 - SAFETY EVALUATION OF RELIEF REQUEST NO. 2207 FOR THE SECOND 10-YEAR PUMP AND VALVE INSERVICE TESTING PROGRAM (TAC NUMBER MB7685)

Dear Mr. Skolds:

By letter dated February 3, 2003, AmerGen Energy Company (AmerGen), LLC, submitted Relief Request No. 2207 to extend the exercising test frequency for check valves 1C11-F122 and 1IA175 from the Code requirements in American Society of Mechanical Engineers/American National Standards Institute OMa-1988, Part 10, Section 4.3.2.2 to the Appendix J testing frequency. The Mechanical and Civil Engineering Branch has reviewed the licensee's request and finds that the licensee's proposed alternative may be authorized pursuant to 10 CFR 50.55a(a)(3)(i) for the second 10-year interval, based on the alternative providing an acceptable level of quality and safety.

The enclosure contains the NRC staff's evaluation. This completes the staff's activities associated with TAC No. MB7685.

Sincerely,
/RA/
Anthony J. Mendiola, Chief, Section 2
Project Directorate III
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

Docket No. 50-461

Enclosure: Safety Evaluation

cc w/encl: See next page

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*See 5/23/03 memorandum from DTerao to AMendiola
** See previous concurrence

ADAMS Accession Number: ML031500511

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SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO THE INSERVICE TESTING PROGRAM, SECOND 10-YEAR INTERVAL

AMERGEN ENERGY CO., LLC

CLINTON POWER STATION, UNIT 1

DOCKET NO. 50-461

1.0 INTRODUCTION

By letter dated February 3, 2003, AmerGen Energy Company, LLC (the licensee) submitted Relief Request No. 2207 for containment isolation valves 1C11-F122 and 1IA175. Pursuant to 10 CFR 50.55a(a)(3), the licensee requested authorization of an alternative to exercise these valves at the same interval as that required in 10 CFR Part 50, Appendix J, "Primary Reactor Containment Leakage Testing for Water-Cooled Power Reactor," Option B, "Performance Based Requirement." Option B allows a variable testing frequency, based on component performance, and allows test intervals for valves with an acceptable performance to be extended up to once every three refueling outages.

2.0 REGULATORY EVALUATION

Title 10 of the *Code of Federal Regulations* (10 CFR), Section 50.55a, requires that inservice testing (IST) of certain American Society of Mechanical Engineers (ASME) Code Class 1, 2, and 3 pumps and valves be performed at 120-month (10-year) IST program intervals in accordance with a specified ASME Code and applicable addenda, except where alternatives have been authorized or relief has been requested by the licensee and granted by the Nuclear Regulatory Commission (NRC) pursuant to paragraphs (a)(3)(i), (a)(3)(ii), or (f)(6)(i) of 10 CFR 50.55a. In accordance with 10 CFR 50.55a(f)(4)(ii), licensees are required to comply with the requirements of the latest edition and addenda of the ASME Code incorporated by reference in the regulations 12 months prior to the start of the 120-month IST program. Clinton Power Station's second 10-year IST interval is based on the 1987 Edition through the 1988 Addenda of the ASME *Code for Operation and Maintenance of Nuclear Power Plants* (ASME OM Code). In proposing alternatives or requesting relief, the licensee must demonstrate that (1) the proposed alternatives 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 is impractical for the facility. Section 50.55a authorizes the NRC to approve alternatives and grant relief from ASME Code requirements upon making the necessary findings. NRC guidance in Generic Letter (GL) 89-04, "Guidance on Developing Acceptable Inservice Testing Program," provides acceptable alternatives to the Code requirements. Further guidance is given in GL 89-04, Supplement 1, and NUREG-1482, "Guidelines for Inservice Testing at Nuclear Power Plants."

3.0 TECHNICAL EVALUATION

3.1 Code Requirements

ASME/ANSI OMa-1988, Part 10, requires Category C check valves to be tested nominally every 3 months (i.e., quarterly), except as provided by Section 4.3.2.2.

Section 4.3.2.2 requires that valves be tested as follows:

(a) During plant operation, each check valve shall be exercised or examined in a manner that verifies obturator travel to the closed, full-open or partially open position required to fulfill its function.

(b) If full-stroke exercising during plant operation is not practicable, it may be limited to part-stroke during plant operation and full-stroke during cold shutdowns.

(c) If exercising is not practicable during plant operation, it may be limited to full-stroke exercising during cold shutdowns.

(d) If exercising is not practicable during plant operation and full-stroke during cold shutdowns is also not practicable, it may be limited to part-stroke during cold shutdowns, and full-stroke during refueling outages.

(e) If exercising is not practicable during plant operation or cold shutdowns, it may be limited to full-stroke during refueling outages.

(f) Valves full-stroke exercised at shutdowns shall be exercised during each shutdown, except as specified in (g) below. Such exercise is not required if the time period since the previous full-stroke exercise is less than 3 months.

(g) Valve exercising shall commence within 48 hours of achieving cold shutdown, and continue until all testing is complete or the plant is ready to return to power. For extended outages, testing need not be commenced in 48 hours provided all valves required to be tested during cold shutdown will be tested prior to plant startup. However, it is not the intent of this Part to keep the plant in cold shutdown in order to complete cold shutdown testing.

(h) All valve testing required to be performed during a refueling outage shall be completed prior to returning the plant to operation.

3.2 Licensee's Basis for Requesting Relief

The Control Rod Drive (CRD) Water Supply Header Containment Isolation Check Valve, 1C11-F122, is currently exercised in the closed position during each refueling outage. Valve 1C11-F122 is a 2-inch diameter, simple check valve which provides drive water, cooling water and charging water to the CRD Hydraulic Control Units and seal water flow to the Reactor Recirculation Pumps, and serves as the inboard isolation valve for the containment isolation function. Testing this valve in the closed position requires that the CRD system be shut down.

Shutting down the system for an extended period of time will introduce air into the system, requiring venting of individual CRDs which is a very time consuming activity. Entrained air in the CRD system can also cause damage to the Reactor Recirculation Pump seals. High purity water continuously flows through the check valve, minimizing the potential for binding due to cycling or impurities. For these reasons, AmerGen currently tests this valve on a refueling frequency.

Valve 1C11-F122 has no external lever arm or practical means to verify closure other than by performance of a local leak rate test. Non-intrusive testing, although a possible option, would still require system isolation and the introduction of a reverse flow to generate the valve closure, essentially duplicating the steps needed for a local leak rate test. Valve disassembly is not practical because local leakage rate testing would be required both before and after disassembly.

During refueling outages it is desirable to minimize CRD system inoperability time. The CRD system must be in service to perform CRD mechanism change-out and it is the preferred method of maintaining level control in the reactor pressure vessel/refuel pool. Performance of the local leakage rate test necessitates draining the CRD penetration and adjacent piping. Filling and venting of the system is required prior to return to service, and the length of total system inoperability time is increased. It is estimated that it would take several hours (approximately 16-20 hours) to secure and drain the system, complete the test, and refill and vent the system.

The instrument air (IA) Header Containment Isolation Check Valve, 1IA175, is currently exercised in the closed direction during each refueling outage. Valve 1IA175 is a ½ inch, simple check valve located in the supply line that provides instrument air to the actuator of inboard Containment Isolation Valve 1IA006. Since this line taps off the IA header between the containment penetration and 1IA006, this valve performs a primary containment isolation function and is required to close in the event of an accident. Testing this valve during normal operation or during cold shutdown is impractical because it requires isolating and depressurizing a portion of the IA system supply to filter demineralizer control valves located in the drywell. Filtered and dried air continuously flows through the valve, minimizing the potential for binding due to cycling or impurities. This valve has no external lever arm or practical means to verify closure other than by performance of a local leak rate test. Valve disassembly is not a viable option because local leakage rate testing would be required both before and after disassembly. Likewise, due to the size of the valve, non-intrusive techniques are not practical, and essentially the same system manipulations would be needed to isolate the penetration and introduce a closure flow as in doing the local leak rate test. During refueling outages, it is desirable to minimize the loss of instrument air to containment because this valve supplies air to the filter demineralizer control valves which, if air is lost, is the preferred method of maintaining reactor coolant chemistry and providing an alternate shutdown cooling method would be removed.

3.3 Licensee's Proposed Alternative to Code Testing Requirement

Relief is being requested for the exercise testing of the affected CRD and IA system valves. Each of the affected valves has a safety function to close to provide primary containment isolation. Failure of the affected valves could impact the capability to isolate primary containment. The valves are leakage rate tested per 10 CFR Part 50, Appendix J, Option B. Option B allows a variable testing frequency, based on component performance, and allows test intervals for valves with acceptable performance to be extended to once per three refueling outages. The test to exercise these valves closed is verified through performance of the Appendix J leakage rate test. In accordance with the CPS Appendix J Test Program, failure of a valve to meet the acceptance criteria would result in returning to a once per refueling outage test interval until acceptable performance can be demonstrated. AmerGen, therefore, requests a proposed alternative to exercise these valves per the Appendix J testing frequency in lieu of the Code requirement for exercising these valves each refueling outage. This alternative is in accordance with 10 CFR 50.55a(a)(3)(i) where proposed alternatives to the specified Code requirements may be approved by the NRC when it has been demonstrated that the proposed alternatives would provide an acceptable level of quality and safety.

Each of the above mentioned valves are currently exercised during each refueling outage, in accordance with ASME/ANSI OMa-1988, Part 10, Section 4.3.2.2(e). The history of both the maintenance and IST for each valve shows good material condition and test history. Valve 1IA175 has satisfactorily passed all local leakage rate testing since plant startup, with no discernable trend in increasing leakage, thus demonstrating that an acceptable level of quality and safety is maintained when tested per the Appendix J frequency. Valve 1C11-F122 has been replaced once, in 1996, since initial plant operation. The valve was replaced because the leakage rate, while still within accepted limits, was slightly fluctuating by a few hundred standard cubic centimeters per minute (sccm) between one test and the next. The valve has always demonstrated a positive closure. Since replacement, the valve has shown very low leakage (<20 sccm) consistently, again demonstrating that an acceptable level of quality and safety is maintained when tested per the Appendix J frequency. The Option B Program requires any failure to be reverted to a refueling frequency. Should poor performance be detected, the program will require the valves to go back to a refueling frequency.

The Code required frequency of closure exercise testing is once per refueling cycle. However, due to the excellent leakage rate testing performance of each of these valves, and the other components in their respective primary containment penetrations, the local leakage rate testing is only required once per every third outage. The Appendix J testing imposes much more stringent acceptance criteria than the Code specified exercise by requiring quantitative leakage rate measurement, whereas the Code specified exercise only necessitates qualitative proof of valve closure, a much less vigorous test. Performance of additional local leakage rate testing solely to satisfy an exercise requirement of these components places a burden on AmerGen by imposing increased duration for CRD and IA system unavailability/outages. Each of the valves have an established performance history which shows that an acceptable frequency of testing necessary to detect component degradation is achieved through testing on the Appendix J frequency. As such, testing these valves on the Code specified frequency represents an unnecessary burden on AmerGen without a commensurate gain in assurance of the component's ability to perform their safety function. An equivalent level of quality and safety will be provided by testing these valves per the Appendix J testing frequency.

3.4 Staff Evaluation

The ASME/ANSI OMa-1988 Standard, Part 10 requires Category C valves to be exercised every 3 months. If exercising is not practicable during plant operation or cold shutdowns, it may be limited to full-stroke testing during refueling outages. OM Part 10 also requires testing for seat leakage of Category A valves that serve as containment isolation valves in accordance with 10 CFR Part 50, Appendix J. Option B of Appendix J allows a variable seat leakage testing frequency, based on component performance, and allows test intervals for valves with acceptable performance to be extended to once every three refueling outages. Therefore, for Category A/C valves, the Code requires two independent tests: an exercising test and a seat leakage test. The Code recognizes that when more than one distinguishing category characteristic is applicable, all requirements of each of the individual categories are applicable, although duplication or repetition of common testing requirements is unnecessary. On this basis, the closure exercising test for 1C11-F122 and 1IA175 Category A/C containment isolation valves is verified through the performance of the Appendix J leak test.

The licensee identified that test methods other than a leak-rate test to verify closure of valves 1C11-F122 and 1IA175 are not feasible. The valves do not have an external lever arm for exercising. Non-intrusive testing, although a possible option, would still require system isolation and the introduction of a reverse flow to generate the valve closure—essentially duplicating the steps needed for a local leak rate test. Valve disassembly is also not feasible because local leakage rate testing would be required both before and after disassembly. Therefore, the licensee proposed an alternative to exercise valves 1C11-F122 and 1IA175 per the Appendix J testing frequency in lieu of the Code requirements for exercising specified in OM Part 10, Section 4.3.2.2.

The licensee provided a performance-based justification for extending the exercise test interval. The licensee's review of the history of both the maintenance and IST records for each valve found good material condition and acceptable test results. The licensee stated that each of the valves have an established performance history which shows that an acceptable frequency of testing necessary to detect component degradation is achieved through testing on the Appendix J frequency. The Option B Program requires any failure to be reverted to a refueling frequency. Should poor performance be detected, the program will require the valves to go back to a refueling frequency. Based on the above evaluation, the staff finds the licensee's proposed alternative to exercise valves 1C11-F122 and 1IA175 per the Appendix J testing frequency in lieu of the Code requirements specified in Part 10, Section 4.3.2.2, provides an acceptable level of quality and safety.

It should also be noted that the two check valves are relatively small-diameter valves (½- and 2-inch diameter). Establishing a performance-based program for only these two valves was deemed by the staff to be an unnecessary burden. However, if the licensee wishes to extend the exercise interval for any additional check valves during this second 10-year IST interval, the staff recommends that the licensee establish a condition monitoring program in accordance with Appendix II in the 1996 Addenda to the ASME *Code for Operation and Maintenance of Nuclear Power Plants*.

4.0 CONCLUSION

The staff concludes the licensee's proposed alternative to the Code requirements of ASME/ANSI OMa-1988, Part 10, Section 4.3.2.2 for extending the exercise testing frequency of containment isolation check valves 1C11-F122 and 1IA175 to the 10 CFR 50, Appendix J, Option B, leak test frequency is authorized pursuant to 10 CFR 50.55a(a)(3)(i) for the second 10-year interval, based on the alternative providing an acceptable level of quality and safety.

Principal Contributor: James Strnisha, DE/EMEB

Date: June 27, 2003