July 20, 2001

Mr. Ronald DeGregorio
Vice President Oyster Creek
AmerGen Energy Company, LLC
P.O. Box 388
Forked River, NJ 08731

SUBJECT: REQUEST FOR RELIEF FROM THE AMERICAN SOCIETY OF MECHANICAL ENGINEERS BOILER AND PRESSURE VESSEL CODE (ASME CODE), SECTION XI REQUIREMENTS FOR CODE REPAIRS ON CLASS 3 PIPING AT THE OYSTER CREEK NUCLEAR GENERATING STATION (TAC NO. MA9925)

Dear Mr. DeGregorio:

By letter dated August 24, 2000, AmerGen Energy Company, LLC (AmerGen or the licensee) requested approval of a relief request to the requirement of Article IWA-4000 of the 1985 Edition of the American Society of Mechanical Engineers Boiler Pressure and Vessel Code (ASME Code). Specifically, AmerGen requested approval for a one-time, temporary, non-Code repair of a leaking flaw in the service water piping at the Oyster Creek Nuclear Generating Station (Oyster Creek).

AmerGen requested that it be granted relief, pursuant to 10 CFR 50.55a(g)(6)(i), to utilize an alternative to the requirements of Title 10 of the *Code of Federal Regulations* (10 CFR), Section 50.55a(g)(5)(iii), that is, the requirements of IWA-4000 of Section XI of the ASME Code. IWA-4000 requires the removal of the flaw and a subsequent weld repair. AmerGen requested that the relief request be granted because it is impractical to perform a Code repair as the system isolation valves leak excessively. To perform a permanent repair, AmerGen would have needed to remove the service water system from service and to establish alternate cooling, which would have required an extended plant shutdown.

AmerGen performed a temporary non-Code repair consisting of placing a mechanical clamp on the leaking pipe flange interface that eliminated the leakage and provided an acceptable alternative which achieved full-system operability. Even if no clamp had been installed, the approximate 100 gallon-per-minute (gpm) leakage from the service water (SW) system would not have affected the system's ability to cool plant components because the normal flow rate of the SW is about 5000 gpm. The installation of the temporary clamp restored the full-flow capabilities to both of the SW pumps. The SW pumps and the location of the leak were in the intake structure. AmerGen personnel toured and observed them once per shift to detect any degradation of the clamp or leak. Use of the alternative repair process allowed a Code repair to be deferred to the next refueling outage, thus eliminating the need to shutdown Oyster Creek for an extended outage. AmerGen removed the clamp and pipe flange at the location of the flaw during the recent fall 2000 outage and performed a Code repair of the leaking flaw.

The NRC staff has reviewed the August 24, 2000, submittal, and concluded that granting relief pursuant to 10 CFR 50.55a(g)(6)(i) is authorized by law and does 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 AmerGen that would have resulted if the requirements had been imposed on the facility.

The staff's detailed evaluation and conclusions are documented in the enclosed safety evaluation. If you have any questions, please call Helen N. Pastis, the Senior Project Manager for Oyster Creek, at (301) 415-1261.

Sincerely,

/RA/

Richard P. Correia, Acting Chief, Section 1
Project Directorate I
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

Docket No. 50-219

Enclosure: Safety Evaluation

cc w/encl: See next page

The NRC staff has reviewed the August 24, 2000, submittal, and concluded that granting relief pursuant to 10 CFR 50.55a(g)(6)(i) is authorized by law and does 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 AmerGen that would have resulted if the requirements had been imposed on the facility.

The staff's detailed evaluation and conclusions are documented in the enclosed safety evaluation. If you have any questions, please call Helen N. Pastis, the Senior Project Manager for Oyster Creek, at (301) 415-1261.

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SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO GRANTING RELIEF FOR CODE REPAIRS

TO THE SERVICE WATER SYSTEM

AMERGEN ENERGY COMPANY, LLC

OYSTER CREEK NUCLEAR GENERATING STATION

DOCKET NO. 50-219

FACILITY OPERATING LICENSE NO. DPR-16

1.0 INTRODUCTION

Title 10 of the *Code of Federal Regulations* (10 CFR), Section 50.55a(g), requires that nuclear power facility components must meet the requirements contained in specific editions of the American Society of Mechanical Engineers Boiler and Pressure Vessel Code (ASME Code), Section XI, for Inservice Inspection and Repair and Replacement Programs. Specifically, ASME Code, Section XI, IWA-4000, describes the Code repair process and requires the removal of the flaw and a subsequent weld repair. Pursuant to 10 CFR 50.55a(g)(6)(i), the Commission will evaluate determinations under paragraph (g)(5) that the Code requirements are impractical.

AmerGen Energy Company, LLC (AmerGen or the licensee) requested approval of a one-time, temporary, non-Code repair of a leaking flaw in the service water (SW) piping in accordance with 10 CFR 50.55a(g)(5)(iii). The permanent Code repair was considered impractical because it would have required an extensive shutdown of the reactor to permit the removal of the service water system from service and the installation of an alternate cooling water system. The non-Code repair was proposed as an alternative to a requirement of Article IWA-4000 of the 1985 Edition of the ASME Code. Approval of the non-Code repair was requested until the completion of the fall 2000 refueling outage, at which time a permanent Code repair was performed.

On August 21, 2000, AmerGen held a conference call with the U.S. Nuclear Regulatory Commission (NRC) staff to inform the staff that a 100-gpm leaking crack had been found on a 16-inch diameter carbon steel pipe in the SW intake structure. The crack was located at a valve flange weld, in the spool between valves V-3-62 and V-3-33. Because of this crack, pump 1-1 near these valves was declared inoperable at the time of the event, but was fully functional if needed. The system operates at low pressure (75 psi) and at ambient temperature. It is not required for safe shutdown of the reactor nor to mitigate the consequences of postulated accidents, and is therefore, a non-safety related system. However, it does provide cooling water to a number of plant systems and equipment. The normal rate of flow in this system is 5000 gpm.

The temporary non-Code repair performed by AmerGen consisted of encapsulating the crack area with a clamp-type enclosure in which sealant fluid is injected at high pressure. A strong-back attached to the clamp prevents complete separation of the pipe during sealant injection. This event is considered highly unlikely, provided no pipe wall degradation has occurred adjacent to the crack. The device is designed, fabricated, and installed by Team Industrials Services. AmerGen stated that the relief request obviated the need to maintain the reactor in a shutdown condition for an extended period of time.

The licensee stated that the alternative provides a commensurate level of safety that would allow a repair to be deferred until the fall 2000 refueling outage at which time a Code repair was performed. The licensee stated that a Code repair while in operation was impractical.

3.0 EVALUATION

3.1 ASME Code Requirements

The ASME Code, Section XI, for Inservice Inspection and Repair and Replacement Programs, IWA-4000, describes the Code-repair process. A Code repair requires the removal of the flaw and a subsequent weld repair. The SW system is classified as ASME Code, Section XI, Class 3 piping.

3.2 Description of the Licensee Proposed Alternative Repair

Although the licensee stated that it was impractical to perform a Code repair, the licensee did propose an alternative, temporary, non-Code repair consisting of placing a mechanical clamp on the leaking pipe flange interface to eliminate the leakage, and to provide an acceptable alternative which achieves full system operability. The safety significance of the clamp on the SW leak was minimal. Even if no clamp had been installed, the approximate 100 gpm leakage from the SW would not have affected system ability to cool plant components. The normal flow rate of the SW is about 5000 gpm. The installation of the temporary clamp restored full flow capabilities to both of the SW pumps. The 1-1 pump was out of service, pending approval of the temporary non-Code repair. However, if the 1-1 pump were needed for safe plant operation, it was fully functional and would have performed all of its design requirements. Calculations performed to support the repair conclude that the encapsulation complied fully with the design pressure requirements for the system.

The SW is used to cool many plant loads both when the plant is operating and also when it is shut down. The SW, through the Reactor Building Closed Cooling Water system, cools recirculation pump seals, the clean-up system non-regenerative heat exchanger, the spent fuel pool cooling system, and the shutdown cooling system. A Code repair was impractical because the SW pump 1-1 discharge isolation valve leaked excessively. To perform a permanent repair, the licensee would have had to remove the SW from service and to establish alternate cooling, which would have required an extended plant shutdown.

The SW system is a non-safety related, non-seismic Category I, system. It is an open-loop system, taking suction on Barnegat Bay (brackish salt water) at the intake structure and discharging back to the bay via the discharge canal. The SW is classified as ASME Class 3 piping for Inservice Inspection. The pump discharge piping is 16 inches in diameter. The design temperature of the system in this location is 85 °F and the design pressure is 75 psig.

The SW piping is carbon steel, and has been coated both inside and out with a corrosion resistant compound.

The inability to fully isolate the leakage prevented additional characterization of the pipe flaw, and thus it was not possible to make a definitive root cause determination. However, based on experience and the results of some local ultrasonic testing (UT) testing of the pipe, the licensee believes that the leak was the result of highly localized corrosion of the pipe. Local UT testing of piping adjacent to the non-Code clamp that was installed (in the same spool piece) showed no indication of any wastage.

A vendor who specializes in leak repairs designed a clamp to eliminate the leakage. Because the flaw would not be fully characterized, a tie rod assembly of sufficient mechanical strength to prevent any pipe motion in the event of a circumferential break was incorporated into the design. The vendor performed the requisite calculations.

3.3 Staff Evaluation of the Proposed Alternative

AmerGen requested approval of a one-time temporary non-Code repair of a leaking flaw in the plant service water system (SWS) piping, in accordance with 10 CFR 50.55a(g)(5)(iii). The permanent Code repair was considered impractical at that time, because it would have required an extensive shutdown of the plant, to permit the removal of the SWS from service and the installation of an alternate cooling water system. The non-Code repair was proposed as an alternative to a requirement of Article IWA-4000 of the 1985 Edition of the ASME Code. Approval of the non-Code repair was requested until the completion of the upcoming refueling outage, scheduled for October 2000, at which time a permanent Code repair was performed.

By telephone conference dated August 21, 2000, AmerGen informed the staff that a 100 gpm leaking crack had been found on a 16-inch diameter carbon steel pipe of the SWS intake structure. The crack was located at a valve flange weld, in the spool between valves V-3-62 and V-3-33. Because of this crack, pump 1-1 near these valves was declared inoperable at the time of the event, but was fully functional if needed. The system operates at low pressure (75 psi) and at ambient temperature. It is not required for safe shutdown of the reactor nor to mitigate the consequences of postulated accidents, and is therefore a non-safety related system. However, it does provide cooling water to a number of plant systems and equipment. The normal rate of flow in this system is 5000 gpm.

The non-Code repair proposed by AmerGen consisted of encapsulating the crack area with a clamp-type enclosure in which sealant fluid is injected at high pressure. A strong-back attached to the clamp prevented complete separation of the pipe during the sealant injection. This event was considered highly unlikely, provided no pipe wall degradation had occurred adjacent to the crack. The device was designed, fabricated and installed by Team Industrial Services, Inc. Details of the construction of the clamp/enclosure and strong-back structure were provided in the licensee's August 24, 2000, submittal. The staff had reviewed selected details of the design, and found it reasonable and acceptable.

AmerGen also reported the results of an inspection of the wall thickness in the pipe spool adjacent to the crack for degradation. AmerGen stated that no internal wall thickness degradation had been detected. The staff found these results reasonable and acceptable.

AmerGen indicated that it also visually inspected the clamp installation for leakage once per shift, as part of the daily operation inspections. The staff considered this commitment reasonable and acceptable.

The staff found that, after the installation of the temporary non-Code repair, the SW system was in an operable condition, although degraded, and thus available for continued operation under the provisions of Generic Letter 91-18, Revision 1 dated October 8, 1997, "Information to Licensees Regarding NRC Inspection Manual Section in Resolution of Degraded and Non-Conforming Conditions."

Pursuant to 10 CFR 50.55a(g)(5)(iii), the request by AmerGen for implementation of the non-Code repair at Oyster Creek was acceptable until the fall 2000 refueling outage, at which time AmerGen performed the required permanent Code repair in conformance with requirements of ASME Section XI, Article IWA-4000.

Imposition of the Code repair would have required that Oyster Creek shutdown for an extended period to perform the repair. Because use of the alternative repair until the fall 2000 refueling outage provided adequate assurance of structural integrity, compliance with the specified requirements of the Code would have resulted in hardship.

The staff has evaluated the licensee's proposed alternative for Oyster Creek. The staff found that the proposed repair, as described above, was acceptable until the next refueling outage. The NRC staff did not approve the process as a permanent repair for Oyster Creek in lieu of meeting the ASME Code repair criteria, but rather as a temporary repair until such time as a permanent repair could be implemented during the fall 2000 outage. The implementation of the alternative is subject to inspection by the NRC.

4.0 CONCLUSION

The NRC staff concludes that the licensee's proposed alternative provided an acceptable level of quality and safety. Therefore, pursuant to 10 CFR 50.55a(g)(6)(ii)(A)(5), the proposed alternative was authorized until the fall 2000 refueling outage for this relief request.

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Date: July 20, 2001

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