

November 17, 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 (RR-2206) RELATED TO THE SECOND 10-YEAR INSERVICE
TESTING (IST) INTERVAL (TAC NO. MB7810)

Dear Mr. Skolds:

By letter dated February 14, 2003 (RS-03-037) and supplemented by letters dated July 17 (RS-03-135) and October 2, 2003 (RS-03-188), AmerGen Energy Company, LLC (the licensee), submitted a request for relief (RR-2206) from the requirements of the American Society of Mechanical Engineers/American National Standards Institute OM Standard, Part 10 for the Clinton Power Station, Unit 1. The Mechanical and Civil Engineering Branch has completed its review of Relief Request (RR-2206) and concludes that the licensee's proposed alternative to exercise and stroke time test certain shutdown service water (SX) system valves once per fuel cycle, regardless of plant mode, with a 25 percent allowance for flexibility in scheduling may be authorized. Specifically, the proposed alternative is authorized for valves 1SX016A, 1SX016B, 1SX071A, 1SX071B, 1SX073A, 1SX073B, 1SX074A, 1SX074B, 1SX076A, 1SX076B, 1SX105A, 1SX105B, 1SX107A, and 1SX107B pursuant to 10 CFR 50.55a(a)(3)(i) on the basis that the alternative provides an acceptable level of quality and safety.

The proposed alternative is authorized for valves 1SX012A, 1SX012B, 1SX062A, and 1SX062B pursuant to 10 CFR 50.55a(a)(3)(ii) on the basis that compliance with the Code requirements would result in hardship or unusual difficulty without a compensating increase in the level of quality and safety. The proposed alternative is authorized for the remainder of the second 10-year interval inservice testing program.

J. Skolds

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The enclosure contains the Nuclear Regulatory Commission staff's evaluation. This completes the staff's activities associated with TAC No. MB7810.

Sincerely,

/RA by DPickett for/

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

J. Skolds

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OFFICE	PM:LPD3-2	LA:LPD3-2	SC:EMEB	OGC	SC:LPD3-2
NAME	DPickett	THarris	DTerao*	RHoefling	WRuland for AMendiola
DATE	11/06/03	11/05/03	10/23/03	11/13/03	11/07/03

*See DTerao to AMendiola memorandum dated October 23, 2003

OFFICIAL RECORD COPY

Clinton Power Station, Unit 1

cc:

Senior Vice President - Nuclear Services
AmerGen Energy Company, LLC
4300 Winfield Road
Warrenville, IL 60555

Vice President Operations Support
AmerGen Energy Company, LLC
4300 Winfield Road
Warrenville, IL 60555

Vice President - Licensing and
Regulatory Affairs
AmerGen Energy Company, LLC
4300 Winfield Road
Warrenville, IL 60555

Manager Licensing - Clinton and LaSalle
AmerGen Energy Company, LLC
4300 Winfield Road
Warrenville, IL 60555

Regulatory Assurance Manager - Clinton
AmerGen Energy Company, LLC
Clinton Power Station
RR3, Box 228
Clinton, IL 61727-9351

Director Licensing
AmerGen Energy Company, LLC
4300 Winfield Road
Warrenville, IL 60555

Document Control Desk-Licensing
AmerGen Energy Company, LLC
4300 Winfield Road
Warrenville, IL 60555

Site Vice President - Clinton Power Station
AmerGen Energy Company, LLC
Clinton Power Station
RR 3, Box 228
Clinton, IL 61727-9351

Clinton Power Station Plant Manager
AmerGen Energy Company, LLC
Clinton Power Station
RR 3, Box 228
Clinton, IL 61727-9351

Resident Inspector
U.S. Nuclear Regulatory Commission
RR #3, Box 229A
Clinton, IL 61727

Chief Operating Officer
AmerGen Energy Company, LLC
4300 Winfield Road
Warrenville, IL 60555

Regional Administrator, Region III
U.S. Nuclear Regulatory Commission
801 Warrenville Road
Lisle, IL 60532-4351

Senior Counsel, Nuclear
AmerGen Energy Company, LLC
4300 Winfield Road
Warrenville, IL 60555

R. T. Hill
Licensing Services Manager
General Electric Company
175 Curtner Avenue, M/C 481
San Jose, CA 95125

Chairman of DeWitt County
c/o County Clerk's Office
DeWitt County Courthouse
Clinton, IL 61727

Clinton Power Station, Unit 1

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cc:

J. W. Blattner
Project Manager
Sargent & Lundy Engineers
55 East Monroe Street
Chicago, IL 60603

Illinois Emergency Management
Agency
Division of Disaster Assistance &
Preparedness
110 East Adams Street
Springfield, IL 62701-1109

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION
RELATED TO CLINTON POWER STATION, UNIT 1, RELIEF REQUEST NO. 2206
FOR THE SECOND 10-YEAR INSERVICE TESTING INTERVAL

AMERGEN ENERGY COMPANY, LLC (AMERGEN)

DOCKET NO. 50-461

1.0 INTRODUCTION

By letter dated February 14, 2003, AmerGen Energy Company, LLC (the licensee), requested Nuclear Regulatory Commission (NRC) authorization of a proposed alternative to the requirements of the American Society of Mechanical Engineers (ASME)/American National Standards Institute (ANSI) OM Standard, Part 10 for the Clinton Power Station, Unit 1. The licensee proposed to test certain shutdown service water system valves without restriction on the plant operating mode while maintaining a refueling test frequency (currently 18 months). By letters dated July 17 and October 2, 2003, the licensee supplemented its request in response to the staff's request for additional information to support justification of the proposed alternative.

2.0 REGULATORY EVALUATION

The *Code of Federal Regulations* in 10 CFR 50.55a requires that inservice testing (IST) of certain ASME Code Class 1, 2, and 3 pumps and valves be performed at 120-month 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 Commission pursuant to paragraphs (a)(3)(i), (a)(3)(ii), or (f)(6)(i) of 10 CFR 50.55a. 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 its facility. Section 50.55a authorizes 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 the Code requirements which are acceptable to the staff. Further guidance is given in GL 89-04, Supplement 1, and NUREG-1482, "Guidelines for Inservice Testing at Nuclear Power Plants."

The Clinton Power Station, Unit 1, second 10-year IST interval commenced April 24, 1997. The program was developed in accordance with the 1989 ASME Code, Section XI, which references the 1987 Edition with 1988 Addenda of the ASME/ANSI OM Standard, Part 10.

The NRC's findings with respect to authorizing alternatives and granting or denying the IST program relief request are given below.

ENCLOSURE

3.0 TECHNICAL EVALUATION

3.1 Code Requirements

ASME/ANSI OMa-1988, Part 10, paragraph 4.2.1.1, requires Category A and B valves be full-stroke exercise tested nominally every 3 months (i.e., quarterly), except as provided in paragraphs 4.2.1.2, 4.2.1.5, and 4.2.1.7. Paragraph 4.2.1.2(c) states that, if exercising is not practicable during plant operation, it may be limited to full-stroke exercising during cold shutdowns. Paragraph 4.2.1.2(e) states that, if exercising is not practicable during plant operation or cold shutdowns, it may be limited to full-stroke exercising during refueling outages.

The licensee requested relief from the requirements of ASME/ANSI OMa-1988, Part 10, paragraphs 4.2.1.1 and 4.2.1.2(c) for the following shutdown service water system valves:

1SX012A, 1SX012B, 1SX062A, 1SX062B

The licensee requested relief from the requirements of ASME/ANSI OMa-1988, Part 10, paragraphs 4.2.1.1 and 4.2.1.2(e) for the following shutdown service water system valves:

1SX016A, 1SX016B, 1SX071A, 1SX071B, 1SX073A
1SX073B, 1SX074A, 1SX074B, 1SX076A, 1SX076B
1SX105A, 1SX105B, 1SX107A, 1SX107B

3.2 Licensee's Basis for Requesting Relief

The valves are currently normally exercised and stroke time tested during refueling outages in accordance with ASME/ANSI OMa-1988, Part 10, paragraph 4.2.1.2.

Proposed alternative testing is being requested in lieu of the requirements of ASME/ANSI OMa-1988, Part 10, paragraph 4.2.1.1 and paragraph 4.2.1.2 for the exercise and stroke time testing of the affected shutdown service water (SX) valves. The proposed alternative is to allow the option to exercise and stroke time test the valves once per fuel cycle (currently 18 months) regardless of plant mode, with a 25 percent allowance for flexibility in scheduling.

All of the valves within the scope of this request are currently normally exercised and stroke time tested during refueling outages, in accordance with ASME/ANSI OMa-1988, Part 10, paragraph 4.2.1.2. The history of both the maintenance and IST for all valves show good material condition and that testing is consistent with acceptable stroke times.

The availability of the SX system (and emergency core cooling systems) can be optimized by performing the full-stroke test of the valves in scheduled work windows during each operating cycle. Due to improvements in the logistics of planning and executing work, and due to maintaining a high availability of the system during both operating and shutdown conditions, it is often desirous to perform planned maintenance and testing of the SX system with the unit on-line. At other times, particularly if the maintenance requires the system to be out of service greater than the outage time allowed by plant TSS, the nature of the maintenance performed requires that the maintenance be performed during a refueling outage. Regardless, it is desirable to allow the option of testing these valves, either during a planned maintenance outage with the unit online, or during a refueling outage. Considerations that

impact when this work is performed, include the scope of the work on the system, the scheduling of work windows in the planning process, system availability requirements, personnel resources, and maintenance of an acceptable risk profile. Although the burden of testing the valves quarterly is excessive, an on-line system outage, if properly planned and executed, will provide the least overall plant impact and will minimize overall system unavailability while maintaining an acceptable risk profile.

Due to the unique configuration and system interrelationships associated with each of the valves in this discussion, it is impractical to test these valves at a quarterly frequency. However, for Clinton Power Station to achieve maximum overall plant risk minimization, reduced system unavailability, and optimized outage scheduling, it may be necessary to perform SX system maintenance and testing during on-line work windows rather than during refueling outages. Having the option to test these valves during a planned maintenance outage, whether on-line or during a refueling outage, provides an equivalent level of quality and safety.

3.3 Licensee's Proposed Alternative to Code Testing Requirements

The valves will be exercised and stroke time tested once per fuel cycle (currently 18 months) regardless of plant mode, with a 25 percent allowance for flexibility in scheduling.

3.4 Evaluation

Valves 1SX012A, 1SX012B, 1SX062A, and 1SX062B are 14-inch motor-operated valves and are the backup cooling water supply isolation valves to the fuel pool cooling and cleanup (FC) system heat exchangers. They isolate the FC heat exchangers from the SX system. Stroke testing the valves admits raw lake water into the component cooling water side of the FC heat exchangers and requires that the heat exchanger be flushed and then sampled to verify that the component cooling water system has not become contaminated by the lake water.

Valves 1SX016A and 1SX016B are 2.5-inch motor-operated valves and are the emergency makeup water valves to the spent fuel pool. These valves allow for emergency makeup of lake water to the spent fuel pool via the SX system. During normal operation and cold shutdown conditions, the portion of the SX system upstream of these valves is under pressure from the plant service water system. Cycling the valves will introduce raw lake water into the spent fuel pool. Testing requires that a blank flange be installed at the normally open, flanged end of the makeup pipe; filling the void section of pipe; and cycling the valve. After completion of the valve stroking, the void section of pipe must be drained, the blank flange removed, and the valves verified as watertight.

Valves 1SX071A, 1SX071B, 1SX073A, 1SX073B, 1SX074A, 1SX074B, 1SX076A, 1SX076B, 1SX105A, 1SX105B, 1SX107A, and 1SX107B are 3-inch motor-operated valves and are used to supply deluge water to the charcoal beds in the standby gas treatment system and main control room ventilation filter trains from either the fire protection system or the SX system.

Exercising the valves would inject raw water into the charcoal beds, requiring replacement of the charcoal. Testing requires that a spool piece be removed to prevent injection of raw water into the charcoal beds.

The staff recognizes that there is a trade-off from a risk perspective between testing these valves at power, and testing them during outages. The NRC staff also understands that considerations, which impact when this work is performed, include the scope of the work on the system, the scheduling of work windows in the planning process, system availability requirements, personnel resources, and maintenance of an acceptable risk profile.

Prior to performing either on-line or shutdown testing, its effect on risk must be evaluated in accordance with the requirements of 10 CFR 50.65(a)(4) "Requirements for Monitoring the Effectiveness of Maintenance at Nuclear Power Plants" Section 50.65(a)(4) states, in part, "Before performing maintenance activities (including but not limited to surveillance, post-maintenance testing, and corrective and preventive maintenance), the licensee shall assess and manage the increase in risk that may result from the proposed maintenance activities."

In its relief request, AmerGen stated, "Due to improvements in the logistics of planning and executing work, and due to maintaining a high availability of the system during both operating and shutdown conditions, it is often desirous to perform planned maintenance and testing of the SX system with the unit on-line. At other times, particularly if the maintenance requires the system to be out of service greater than the time allowed by plant technical specifications, the nature of the maintenance to be performed requires that the maintenance be performed during a refueling outage."

If the valves are tested on-line during a planned system work window, the valve stroke testing will be bundled within the system work window such that the testing is performed in parallel with other work and will not lengthen the work window or the system outage duration. Typically, each of the affected systems has a divisional outage each quarter in which the bulk of the system maintenance is performed. Such tasks include preventive maintenance on motor operated valves and breakers, instrument calibrations, chiller preventive maintenance activities, filter testing, and preventive maintenance on damper actuators. The history of both the maintenance and in-service testing for all valves show good material condition and that testing is consistent with acceptable stroke times.

In reviewing the licensee submittal, the staff determined that valves 1SX012A, 1SX012B, 1SX062A, and 1SX062B are identified as being exercised on a cold shutdown frequency per the second 10-year interval pump and valve testing program plan as opposed to being exercised on a refueling frequency. In a letter dated July 17, 2003, the licensee stated that AmerGen had included the valves in the relief request with the understanding that these valves, unlike the other valves in the relief request, are on a cold shutdown frequency in accordance with ASME/ANSI OMa-1988, Part 10, paragraph 4.2.1.2(c). Therefore it was an oversight that the valves were identified as being tested in accordance with paragraph 4.2.1.2(e). In a letter dated October 2, 2003, the licensee provided supplemental information to support justification of the proposed alternative with respect to valves 1SX012A, 1SX012B, 1SX062A, and 1SX062B.

Valves 1SX012A, 1SX012B, 1SX062A, and 1SX062B are relatively large (14-inch diameter) valves. The licensee's proposed alternative testing would change the Code-required testing frequency from cold shutdown to once per fuel cycle. Resources and scheduled activities during a cold shutdown are primarily devoted to recovery from the shutdown and expeditiously returning the unit to power. Testing the valves results in the need for the heat exchangers to be flushed and sampled (due to water quality concerns) after the valves are cycled to restore the heat exchangers to a cleanliness level required to place the component cooling water system in service through the heat exchangers. Historically, the time required to drain and refill the heat exchangers is 16 to 24 hours, however, the time required could be increased if additional flushing is required. Testing the valves quarterly or at cold shutdown results in hardship or unusual difficulty without a compensating increase in the level of quality and safety based on the maintenance activities (flushing and sampling) required to recover from the valve testing evolution. Testing the valves during a refueling outage could have a potential adverse impact on the conduct of refueling operations in that: 1) during plant shutdown for refueling, the amount of time and resources necessary to stroke the valves and restore the heat exchangers would detract from the expeditious transition into the refueling activity; 2) availability of the spent fuel pool cooling system is vital to maintaining acceptable fuel pool temperatures with recently discharged fuel assemblies present and it is necessary to maintain the spent fuel pool cooling system in service during refueling to provide acceptable water clarity in the upper containment fuel pools and remove radioactive contaminants from the pool water in order to minimize the radiation level in the vicinity of the pool and the release of radioisotopes from the pool water into the air and; 3) performing the required testing activities after refueling activities are complete could put the testing on critical path and possibly delay unit startup.

The NRC staff finds that the licensee's proposed alternative to exercise and stroke time test certain shutdown service water system valves once per fuel cycle regardless of plant mode with a 25 percent allowance for flexibility in scheduling is reasonable and technically sound because it provides the equivalent test interval required by the ASME Code and allows for flexibility in performance of the test. Therefore, the proposed alternative is authorized for valves 1SX016A, 1SX016B, 1SX071A, 1SX071B, 1SX073A, 1SX073B, 1SX074A, 1SX074B, 1SX076A, 1SX076B, 1SX105A, 1SX105B, 1SX107A, and 1SX107B pursuant to 10 CFR 50.55a(a)(3)(i) on the basis that the alternative provides an acceptable level of quality and safety. The NRC staff based its conclusion on the following: 1) all the valves are ASME Code Class 3; are relatively small (3 inches or smaller); and have a low failure rate; 2) planned activities are evaluated utilizing risk insights to determine the impact on safe operation of the plant and the ability to maintain associated safety margins and; 3) the valves are currently tested on a once per fuel cycle frequency during refueling. Furthermore, the proposed alternative is authorized for valves 1SX012A, 1SX012B, 1SX062A, and 1SX062B pursuant to 10 CFR 50.55a(a)(3)(ii) on the basis that compliance would result in hardship or unusual difficulty without a compensating increase in the level of quality and safety. The NRC staff based its conclusion on the following: 1) testing the valves quarterly or at cold shutdown results in hardship or unusual difficulty without a compensating increase in the level of quality and safety based on the maintenance activities (flushing and sampling) required to recover from the valve testing evolution; 2) testing the valves during a refueling outage could have a potential adverse impact to the conduct of refueling operations and; 3) planned activities are evaluated utilizing risk insights to determine the impact on safe operation of the plant and the ability to maintain associated safety margins.

3.5 Conclusion

The NRC staff finds that the licensee's proposed alternative to exercise and stroke time test certain shutdown service water system valves once per fuel cycle regardless of plant mode with a 25 percent allowance for flexibility in scheduling is authorized for valves 1SX016A, 1SX016B, 1SX071A, 1SX071B, 1SX073A, 1SX073B, 1SX074A, 1SX074B, 1SX076A, 1SX076B, 1SX105A, 1SX105B, 1SX107A, and 1SX107B pursuant to 10 CFR 50.55a(a)(3)(i) on the basis that the alternative provides an acceptable level of quality and safety. In addition, the proposed alternative is authorized for valves 1SX012A, 1SX012B, 1SX062A, and 1SX062B pursuant to 10 CFR 50.55a(a)(3)(ii) on the basis that compliance would result in hardship or unusual difficulty without a compensating increase in the level of quality and safety.

Primary Contributor: W. Poertner, EMEB, NRR

Date: November 17, 2003

4.0 REFERENCES

1. *U.S. Code of Federal Regulations*, "Domestic Licensing of Production and Utilization Facilities," Part 50, Chapter I, Title 10, "Energy," paragraph 50.55a(a)(3)(i) and 50.55a(a)(3)(ii).
2. American Society of Mechanical Engineers, *ASME Code for Operation and Maintenance of Nuclear Power Plants*, 1987 Edition with 1988 Addenda, New York, NY.
3. U.S. Nuclear Regulatory Commission, "Guidance on Developing Acceptable Inservice Testing Programs," Generic Letter 89-04, through Supplement 1, April 4, 1995.
4. U.S. Nuclear Regulatory Commission, "Guidelines for Inservice Testing at Nuclear Power Plants," NUREG-1482, April 1995.
5. U.S. Nuclear Regulatory Commission, "Relief Request Reviews," NRR Office Instruction LIC-102, July 18, 2002.
6. Letter, K. R. Jury, AmerGen Energy Company, LLC to the Nuclear Regulatory Commission, "Proposed Alternative Testing Requirements for Shutdown Service Water System Valves for the Second 10-year Inservice Testing Program," dated February 14, 2003.
7. Letter, K. R. Jury, AmerGen Energy Company, LLC to the Nuclear Regulatory Commission, "Additional Information Supporting the Proposed Alternative Testing Requirements for Shutdown Service Water System Valves for the Second 10-Year Inservice Testing Program," dated July 17, 2003.
8. Letter, P. R. Simpson, AmerGen Energy Company, LLC to the Nuclear Regulatory Commission, "Supplemental Information Supporting the Proposed Alternative Testing Requirements for Shutdown Service Water System Valves for the Second 10-Year Inservice Testing Program," dated October 2, 2003.