

October 4, 2004

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

SUBJECT: OYSTER CREEK NUCLEAR GENERATING STATION - ISSUANCE OF
AMENDMENT RE: CONTROL ROD SCRAM TIME TESTING REQUIREMENTS
(TAC NO. MC2405)

Dear Mr. Crane:

The Commission has issued the enclosed Amendment No. 249 to Facility Operating License No. DPR-16 for the Oyster Creek Nuclear Generating Station, in response to your application dated March 19, 2004.

The amendment revised the Technical Specifications, changing the surveillance requirements associated with control rod scram time testing. Specifically, the amendment modified the conditions under which scram time testing of control rods is required, and added a requirement to perform such testing on a defined portion of control rods at a specified frequency during the operating cycle.

A copy of the related Safety Evaluation is also enclosed. Notice of Issuance will be included in the Commission's biweekly Federal Register notice.

Sincerely,

/RA/

Peter S. Tam, Senior Project Manager, Section 1
Project Directorate I
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

Docket No. 50-219

Enclosures: 1. Amendment No. 249 to DPR-16
2. Safety Evaluation

cc w/encls: See next page

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AMERGEN ENERGY COMPANY, LLC

DOCKET NO. 50-219

OYSTER CREEK NUCLEAR GENERATING STATION

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 249
License No. DPR-16

1. The Nuclear Regulatory Commission (the Commission) has found that:
 - A. The application for amendment by AmerGen Energy Company, LLC, et al., (the licensee), dated March 19, 2004, complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act), and the Commission's rules and regulations set forth in 10 CFR Chapter I;
 - B. The facility will operate in conformity with the application, the provisions of the Act, and the rules and regulations of the Commission;
 - C. There is reasonable assurance: (i) that the activities authorized by this amendment can be conducted without endangering the health and safety of the public, and (ii) that such activities will be conducted in compliance with the Commission's regulations;
 - D. The issuance of this amendment will not be inimical to the common defense and security or to the health and safety of the public; and
 - E. The issuance of this amendment is in accordance with 10 CFR Part 51 of the Commission's regulations and all applicable requirements have been satisfied.

2. Accordingly, the license is amended by changes to the Technical Specifications as indicated in the attachment to this license amendment, and paragraph 2.C.(2) of Facility Operating License No. DPR-16 is hereby amended to read as follows:

(2) Technical Specifications

The Technical Specifications contained in Appendices A and B, as revised through Amendment No. 249, are hereby incorporated in the license. AmerGen Energy Company, LLC, shall operate the facility in accordance with the Technical Specifications.

3. This license amendment is effective as of the date of issuance and shall be implemented within 60 days of issuance.

FOR THE NUCLEAR REGULATORY COMMISSION

/RA/

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

Attachment: Changes to the Technical
Specifications

Date of Issuance: October 4, 2004

ATTACHMENT TO LICENSE AMENDMENT NO. 249

FACILITY OPERATING LICENSE NO. DPR-16

DOCKET NO. 50-219

Replace the following pages of Appendix A, Technical Specifications, with the attached revised pages as indicated. The revised pages are identified by amendment number and contain marginal lines indicating the areas of change.

Remove

4.2-1
4.2-3
4.10-1
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Insert

4.2-1
4.2-3
4.10-1
4.10-2

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO AMENDMENT NO. 249

TO FACILITY OPERATING LICENSE NO. DPR-16

AMERGEN ENERGY COMPANY, LCC

OYSTER CREEK NUCLEAR GENERATING STATION

DOCKET NO. 50-219

1.0 INTRODUCTION

By letter dated March 19, 2004 (Accession No. 040900331), AmerGen Energy Company, LLC (the licensee) submitted an application for amendment to revise the Appendix A, Technical Specifications (TSs) for the Oyster Creek Nuclear Generating Station (OCNGS). The proposed amendment would change the surveillance requirements (SRs) associated with control rod scram time testing (STT). Specifically, the amendment would modify the conditions under which STT of control rods is required, and would add a requirement to perform the STT on a defined portion of control rods at a specified frequency during the operating cycle.

Control rod STT is required by the TSs to be performed following refueling outages, prolonged shutdowns and control rod maintenance. The STT is performed to demonstrate that the control rods are performing as expected and within the limits prescribed by the unit's safety analysis.

The proposed SR modifications would upgrade and improve the OCNGS STT requirements to be more consistent with those of other boiling-water reactors (BWRs) by: (1) eliminating unnecessary depressurized STT of non-maintenance affected control rods, (2) providing the periodic STT data necessary to apply actual scram times for implementation of improved Option B minimum critical power ratio (MCPR) operating limits, and (3) eliminating the resulting redundant requirement to test "eight selected rods" after a reactor scram or other outage.

The proposed SR changes are, in general, consistent with the guidelines of NUREG-1433, Revision 2, "Improved Standard TS (ISTS) for Boiling Water Reactors." Certain deviations from the ISTS are necessary due to the non-standard content and format of the current custom TSs for OCNGS. The wording of the proposed SR for OCNGS is consistent with a similar SR in the Limerick Generating Station, Unit 1, TSs (approved by the NRC in Amendment No. 99, dated July 18, 1995).

2.0 REGULATORY EVALUATION

Title 10 of the *Code of Federal Regulations* (10 CFR), Section 50.36, "Technical specifications," provides the regulatory requirements for the content required in the plant TSs. Specifically, 10 CFR 50.36, paragraph (c)(3), states that "Surveillance requirements are requirements relating to test, calibration, or inspection to assure that the necessary quality of systems and components is maintained, that facility operation will be within safety limits, and that the limiting conditions for operation will be met."

The use of SRs for STT satisfies 10 CFR 50.36(c)(3) for inclusion in the TSs, in that it is a SR to assure that the quality of control rod performance is maintained and that reactor operation will be within safety limits, and that limiting conditions for operation (LCOs) will be met.

10 CFR Part 50, Appendix A, "General Design Criteria for Nuclear Power Plants," Criterion 10 (GDC 10)* requires that the reactor core and associated coolant, control, and protective systems shall be designed with appropriate margin to assure that specified acceptable fuel design limits (SAFDLs) are not exceeded during any condition of normal operation, including the effects of anticipated operational occurrences (AOOs). GDC 26* requires that control rods shall be capable of reliably controlling reactivity changes to assure that under conditions of normal operation, including AOOs, SAFDLs are not exceeded.

The staff review acceptance guidance is based on NUREG-0800, "Standard Review Plan (SRP)," Section 4.2 "Fuel System Design." These criteria include three parts: (1) design bases that describe SAFDLs as depicted in GDC 10 and GDC 26, (2) design evaluation that demonstrates that the design bases are met, and (3) testing, inspection, and surveillance plans that show that there are adequate monitoring and surveillance of irradiated fuel. The design bases include (1) fuel system damage, (2) fuel rod failure, and (3) fuel coolability. The MCPR, linear heat generation rate, and average planar linear heat generation ratio limits are part of the SAFDLs.

3.0 TECHNICAL EVALUATION

OCNGS employs a nuclear steam supply system designed by General Electric Nuclear Energy (GENE). It is a BWR class Type 2 (BWR/2) plant. It is a non-jet pump plant with five external recirculation pumps and a Mark I containment. The plant began commercial operation in December 1969. The reactor core contains 560 fuel assemblies with 137 control rods.

TS 4.2 contains the SRs to verify the capability for reactivity control. TS 4.10 contains the SRs to assure that the limits of TS 3.10 are not being violated during power operation for core parameters related to Emergency Core Cooling System (ECCS) performance. The proposed changes will only modify the SRs associated with TS 4.2.C and TS 4.10.C, and will not affect the LCOs or any actions to be taken if the LCO requirements are not met.

*OCNGS was constructed before the GDCs of 10 CFR Part 50 were promulgated. Over the years, the licensee had committed to some GDCs (e.g., see NUREG-1382, Safety Evaluation Report Related to the Full-Term Operating License for OCNGS, January 1991). The NRC staff used GDCs 10 and 26 as standards for this review because they summarize the NRC staff's technical position on the subject matters, not because the licensee committed to them.

The proposed SR is intended to ensure that the proper MCPR is used, based on the results of the STT.

3.1 TS Section 4.2.C, "Reactivity Control"

Control rod STT is required by TSs to be performed following refueling outages, prolonged shutdowns and control rod maintenance. The STT is performed to demonstrate that the control rods are performing as expected and within the limits prescribed by the plant safety analysis.

The proposed changes would modify the conditions under which STT of control rods is required. The changes would also add a requirement to perform STT on a defined portion of control rods, at a specified frequency during the operating cycle. Currently, many BWR licensees perform this proposed STT surveillance every 120 days, testing 10% of the total control rod population each time. This results in approximately 30% of the total control rod population being tested each year of operation.

The licensee's proposed new SR would require STT "on a frequency of less than or equal to once per 180 days of cumulative power operation, for at least 20 control rods, on a rotating basis, with reactor coolant pressure greater than 800 psig." The combination of the proposed surveillance frequency (180 days) and the number of control rods tested (20 out of a total of 137 rods equal to 14.6%) leads to approximately 30% (29.2%) of the total control rod population being tested each year of operation.

The proposed surveillance frequency and the test population for the new SR was based on a review of current industry standard practice, with consideration of the current OCNCS operational practices and other SRs. Implementation of the new SR will require plant power reductions, which will be coordinated with other activities requiring power reduction (control rod sequence exchanges and core spray system surveillance testing at approximately 90-day intervals).

The current OCNCS TS requirements result in unnecessary scram cycles of control rods and control rod drive (CRD) components, particularly under depressurized conditions. Currently, if a control rod has not been tested during the plant hydrostatic test, it must be tested at both depressurized and pressurized reactor conditions. Depressurized STT of non-maintenance-affected CRDs is not routinely performed on other BWRs in this country, and is unnecessary since the CRDs will be fully tested at pressure, which is more representative of actual performance when the control rods are required to perform their safety function to shutdown the reactor. The industry standard is to perform STT on non-maintenance-affected control rods only prior to exceeding 40% thermal power, following core alterations or after a reactor shutdown that exceeds 120 days. The current OCNCS SRs also specify that, following a reactor scram or other outage, STT will be performed on eight selected control rods to monitor performance and provide early indication of possible deterioration requiring maintenance.

The proposed amendment would eliminate the requirement to test non-maintenance-affected control rods prior to startup. This is consistent with the industry standard for non-maintenance-affected rods. The proposed amendment would also eliminate the SR for testing "eight selected rods" after a reactor scram or other outage. The addition of a new STT SR to be performed on 20 or more control rods on a 180-day frequency provides sufficient information for monitoring control rod performance and results in approximately 30% of the total control rod

population being tested each year, which is consistent with current practice at other BWRs. Furthermore, the proposed new SR will ensure that all control rods are scram time tested at greater than 800 psig reactor pressure prior to exceeding 40% thermal power. Since this satisfies the intent of GDC 10, the NRC staff finds it acceptable.

3.2 TS Section 4.10.C, "Minimum Critical Power Ratio (MCPR)"

The MCPR is the ratio of the fuel assembly power that would result in the onset of boiling transition (the critical power) to the actual fuel assembly power. The critical power has been adopted as a fuel design criterion. The MCPR Safety Limit is set such that 99.9% of the fuel rods avoid boiling transition when operation within the limit is maintained. The MCPR operating limit is established to ensure that no fuel damage results during AOOs. The MCPR operating limit provides protection against violating the fuel cladding safety limit during the limiting power transient analyzed in Section 15.2, "Decrease in Heat Removal by the Secondary System," of the Oyster Creek Updated Final Safety Analysis Report. The operating limit MCPR values are specified in the Core Operating Limits Report (COLR). TS 3.10.C and TS 4.10.C require that all MCPR values be greater than or equal to the operating limit MCPR values specified in the COLR when the reactor thermal power is greater than or equal to 25% of the rated thermal power.

The proposed amendment would add a SR to determine the MCPR operating limit within 72 hours following completion of the control rod STT per SR 4.2.C. The proposed SR is intended to demonstrate that the proper MCPR operating limit is used, based on the results of scram time testing, so that the MCPR safety limit will not be exceeded. This ensures that all analyzed transient results remain well within the design values for structures, systems and components.

The methodology for use of the Option A and Option B MCPR limits is included in the NRC-approved General Electric Standard Application for Reactor Fuel, GESTAR-II (Topical Report NEDE-24011-P-A, "General Electric Standard Application for Reactor Fuel, GESTAR-II," as amended through Amendment 26), which is currently referenced in the OCNCS TS Bases.

Currently, TS 3.2.B, "Control Rod System," minimum scram time speed is used to determine the operating limit MCPR values, using the Option A MCPR methodology from GESTAR-II. The Option B MCPR methodology approved in the same reference allows use of a faster mean control rod scram speed performance from a measured scram speed distribution to provide for a lower operating limit MCPR. To implement the Option B methodology, it must be demonstrated that the measured scram speed distribution is consistent with that used in the transient analyses. This requires additional scram speed data beyond what is required to comply with the TS scram speed limit. The proposed new SR in TS 4.2.C is used to determine the actual speed distribution. The operating limit MCPR values can then be determined based either upon the TS 3.2.B.3-required scram times, or upon the mean value of the actual measured scram time distribution. Since the actual scram speed distribution may change after control rod maintenance or a startup, or even during an operating cycle, the Option B operating limit MCPR value must be redetermined within 72 hours after completion of each set of control rod scram time tests required by TS 4.2.C. The licensee's proposed SR for TS 4.10.C is based on the ISTS and is consistent with the specified completion time stated therein.

The NRC staff found the proposed TS 4.10.C SR acceptable since it is consistent with the intent of the ISTS and is sufficient to generate the scram time data required to use the approved GESTAR-II Option B MCPR methodology consistent with the intent of GDC 10.

3.3 Summary of Technical Evaluation

The licensee proposed changes that would modify the SRs associated with TS 4.2.C and TS 4.10.C. The proposed SRs will eliminate unnecessary depressurized STT of non-maintenance-affected control rods, and will replace the requirement to test 8 selected rods after a reactor scram or outage with a requirement to perform periodic STT of 20 or more rods. The proposed SRs will also ensure that the MCPR safety limit is not exceeded, while providing for additional operating margin, by using the proper MCPR operating limit, based on the results of periodic prescribed scram time testing. The proposed changes are consistent with the intent of NUREG-1433, Revision 2, "Standard Technical Specifications, General Electric Plants, BWR/4."

The NRC staff finds the proposed changes acceptable since control rod performance will be monitored consistent with industry standards, while ensuring that the MCPR safety limit of Section 3.10.C is not challenged during any transient event that occurs with moderate frequency.

4.0 STATE CONSULTATION

In accordance with the Commission's regulations, the New Jersey State official was notified of the proposed issuance of the amendment. The State official had no comments.

5.0 ENVIRONMENTAL CONSIDERATION

The amendment changes surveillance requirements. The NRC staff has determined that the amendment involves no significant increase in the amounts, and no significant change in the types, of any effluents that may be released offsite, and that there is no significant increase in individual or cumulative occupational radiation exposure. The Commission has previously issued a proposed finding that the amendment involves no significant hazards consideration, and there has been no public comment on such finding (69 FR 22878). Accordingly, the amendment meets the eligibility criteria for categorical exclusion set forth in 10 CFR 51.22(c)(9). Pursuant to 10 CFR 51.22(b) no environmental impact statement or environmental assessment need be prepared in connection with the issuance of the amendment.

6.0 CONCLUSION

The Commission has concluded, based on the considerations discussed above, that: (1) there is reasonable assurance that the health and safety of the public will not be endangered by

operation in the proposed manner, (2) such activities will be conducted in compliance with the Commission's regulations, and (3) the issuance of the amendment will not be inimical to the common defense and security or to the health and safety of the public.

Principal Contributor: E. D. Kendrick

Date: October 4, 2004

Oyster Creek Nuclear Generating Station

cc:

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