February 29, 2000

Mr. Mike Reandeau
Director - Licensing
Clinton Power Station
P.O. Box 678
Mail Code #V920
Clinton, IL 61727

SUBJECT: ISSUANCE OF AMENDMENT - CLINTON POWER STATION, UNIT 1 (TAC NO. MA4911)

Dear Mr. Reandeau:

The U.S. Nuclear Regulatory Commission (Commission) has issued the enclosed Amendment No. 124 to Facility Operating License No. NPF-62 for the Clinton Power Station, Unit 1. The amendment is in response to the application dated March 1, 1999, filed by Illinois Power Company (IP), the licensee at that time. Subsequent to that filing, AmerGen Energy Company, LLC, the current licensee, adopted the license amendment requests submitted by IP.

The amendment approves changes to the Updated Safety Analysis Report concerning design requirements for physical protection from tornado missiles.

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

Sincerely,

/RA/

Jon B. Hopkins, Senior Project Manager, Section 2
Project Directorate III
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

Docket No. 50-461

Enclosures: 1. Amendment No. 124 to NPF-62
2. Safety Evaluation

cc w/encls: See next page

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February 29, 2000

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AMERGEN ENERGY COMPANY, LLC

DOCKET NO. 50-461

CLINTON POWER STATION, UNIT 1

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 124
License No. NPF-62

1. The U.S. Nuclear Regulatory Commission (the Commission) has found that:

   A. The application for amendment by AmerGen Energy Company, LLC (the licensee), dated March 1, 1999, 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 to approve changes to the Updated Safety Analysis Report (USAR) concerning design requirements for physical protection from tornado missiles as described in the licensee's letter of March 1, 1999. A description of these changes shall be included in the next USAR update.

3. This license amendment is effective as of its date of issuance and shall be implemented within 30 days of issuance.

FOR THE NUCLEAR REGULATORY COMMISSION

/RA/

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

Date of Issuance: February 29, 2000

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO AMENDMENT NO. 124 TO FACILITY OPERATING LICENSE NO. NPF-62

AMERGEN ENERGY COMPANY, LLC

CLINTON POWER STATION, UNIT 1

DOCKET NO. 50-461

1.0 INTRODUCTION

By letter dated March 1, 1999, the previous licensee, Illinois Power Company (IP), for Clinton Power Station (CPS), requested an amendment to the Operating License No. NPF-62. By letter dated February 1, 2000, AmerGen Energy Company, LLC, the current licensee, adopted the license amendment requests submitted by IP. The amendment proposed changes to the CPS Updated Safety Analysis Report (USAR) concerning the requirements for physical protection from tornado generated missiles (TGMs) for safety-related systems/components and the methodology used to determine which systems/components require physical protection from TGMs.

2.0 BACKGROUND

During the CPS license application, the licensee identified and listed the TGMs in Table 3.5-4 of the Final Safety Analysis Report (FSAR). The licensee performed analyses and determined that safety-related systems/components which had a minimum of 5 inches of reinforced concrete over them and were located 4 feet below finished grade for protection would not be damaged by these TGMs. For those safety-related systems/components for which the soil coverage was less than 4 feet, the licensee performed TGM hazard analyses to determine the probability of a TGM strike. Results of the analyses indicated that the probability of a TGM strike was less than 1×10^{-7} per year. Therefore, damage from TGMs was not considered a design basis for those safety-related systems/components. As stated in Supplement 6 to the CPS Safety Evaluation Report (SER), the NRC staff found this acceptable.

During recent reviews of safety-related systems/components for potential targets susceptible to TGM damage, the licensee identified that some ventilation openings and doors in the control building walls, openings in the main floor of the circulating water screen house, and penetrations in the walls and roofs of safety-related buildings are potential TGM targets which were not previously identified during the CPS license application as TGM targets and are not protected from TGMs. Subsequently, the licensee re-performed the TGM hazard probability analyses to include these new TGM targets or TGM targets not considered in previous analyses.

Also, the licensee identified that portions of the safety-related high pressure core spray (HPCS) and reactor core isolation cooling (RCIC) system suction piping from the RCIC storage tank to

the fuel building wall (approximately 20 feet) are not protected from TGMs. The licensee performed evaluations to determine the TGM hazard probability of not having physical protection for HPCS or RCIC system suction piping against TGMs. Subsequently, the licensee proposed to revise the CPS USAR to address:

a. Requirements of physical protection for certain safety-related systems or components due to their proximity or exposure to building/structural openings, barriers or penetrations identified as potential TGM targets.

b. Requirements of physical protection against TGMs for piping between the fuel building and the RCIC storage tank.

c. The addition of two new sections to describe the CPS approach and the NRC-approved methodology used to determine if systems/components require physical protection against TGMs.

3.0 EVALUATION

3.1 New USAR Section 3.5.2.4, "Systems/Components Not Requiring Unique Tornado Missile Protection"

The licensee proposed to add a new section (Section 3.5.2.4) to discuss the approaches used to evaluate/determine those safety-related systems and components located near penetrations in Seismic Category I structures or located outside of such structures that did not require TGM protection barriers.

The licensee stated that the following two approaches were used in the evaluation:

a. Criteria of Regulatory Guide (RG) 1.117, "Tornado Design Classification," including its Appendix are used to screen out which safety-related systems and structures should be protected from TGMs.

b. The licensee stated that safety-related structures, systems and components are generally protected from TGMs. The limited amount of unprotected portions of these structures, systems and components are analyzed using a probabilistic missile strike analysis in accordance with the guidance described in Standard Review Plan (SRP) Section 3.5.1.4, "Missiles Generated By Natural Phenomena," to determine the total (cumulative) probability per year of TGMs striking them.

   The allowable level established for the protection of such structures, systems and components important to safety at CPS is consistent with the acceptance criteria described in SRP Section 2.2.3, "Evaluation of Potential Accidents," and that the acceptance criteria for the total cumulative probability of TGMs striking an important systems/components must be less than 1×10^{-6} per year.

Based on its review, the staff finds that the above cited approaches and acceptance criteria used to determine TGM targets not requiring physical protection against TGMs incorporate

NRC guidance and are acceptable. Therefore, the staff concludes that the addition of this new Section 3.5.2.4 to the USAR is acceptable.

3.2 New USAR Section 3.5.2.5, "TORMIS Description"

The licensee proposed to add a new section (Section 3.5.2.5) to the USAR to briefly describe the methodology used for CPS probabilistic missile strike analysis. The licensee stated that the probabilistic missile strike analysis for CPS was based on a methodology, "Tornado Missile Risk Evaluation Methodology (EPRI NP-2005)," developed by Electric Power Research Institute (EPRI). It is also known as TORMIS and is an NRC-approved[1] methodology used to determine the probability of TGMs striking targets (i.e., walls and roofs of buildings on which penetrations or exposed portions of systems/components are located).

Based on its review, the staff finds the addition of this new Section 3.5.2.5 to the USAR appropriate and acceptable.

3.3 Changes Regarding Probabilistic Evaluation of Targets Potentially Susceptible to Damage From Tornado Missiles

Results of the recent TGM analyses which included targets not considered in previous analyses indicate that on an individual system basis, the probability of system failure due to TGM damage is less than 1×10^{-7} per year which was previously found acceptable in the Supplement 6 to the SER. On a cumulative basis, the TGM hazard probability is approximately 3.4×10^{-7} per year for all targets which is slightly higher than the threshold previously accepted in the Supplement 6 to the SER. However, it is still lower than the guidance[2] as described in Standard Review Plan (SRP) Section 2.2.3. Therefore, the licensee concluded that no additional physical protection barriers are required for any of the new or additional openings, doors or penetrations not previously considered.

Based on its review, the staff finds that with the consideration of the new or additional openings, doors, or penetrations not previously considered, there is a slight increase in the probability of a malfunction of equipment important to safety. However, the probability of a TGM striking or damaging these targets is less than 1×10^{-6} per year and meets the guidance described in the SRP; therefore, the staff concurs with the licensee that no additional physical protection barriers are required for any of the new or additional openings, doors or penetrations not previously considered.

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[1] See NRC Safety Evaluation for EPRI NP-2005 dated October 26, 1983.

[2] SRP Section 2.2.3 states that an event with an occurrence frequency of approximately 1.0E-07 per year or less need not be considered as a credible event. SRP Section 2.2.3 further states that it is acceptable to not postulate events for which the expected frequency of occurrence is 1.0E-06 per year if, when combined with reasonable qualitative arguments, the realistic probability can be shown to be lower.

Accordingly, the licensee proposed the following changes to the USAR to reflect the above conclusion:

a. USAR Section 1.8, “Compliance to Regulatory Guides,” will be revised to discuss/clarify how CPS will comply with the guidance of Regulatory Guide 1.117, Revision 1, (April 1978), “Tornado Design Classification”; and to refer the tornado missile analysis to the new USAR Sections 3.5.2.4 and 3.5.2.5.

b. USAR Table 3.5.5, “Protected Components and Associated Missile Barriers for Externally Generated Missiles,” will be revised to reflect that there are portions of the circulating water screen house and control building that do not require complete tornado missile barrier protection (based on the analysis described in the new USAR Sections 3.5.2.4 and 3.5.2.5).

c. USAR Table 3.5.6, “Concrete Barrier Parameters,” will have a note added that penetrations in exterior walls and roofs in safety-related buildings are analyzed using the TORMIS described in USAR Sections 3.5.2.4 and 3.5.2.5.

The staff finds that the above changes to the USAR appropriately reflect: CPS’s conformance to Regulatory Guides; the use of NRC-approved methodology for TGM analyses; and the systems/components not required to have complete TGM protection barriers. Therefore, the staff finds them acceptable.

3.4 Changes Involving Tornado Missile Protection of the RCIC Storage Tank

The licensee, using the TORMIS, performed analyses to determine the probability of a TGM striking the structural steel members of the RCIC storage tank building and piping (HPCS and RCIC suction lines, and the RCIC storage tank level instrumentation line) between the fuel building and the RCIC storage tank. Results of the analyses indicated that a TGM striking probability is 3.08×10^{-8} per year which is below the threshold of 1×10^{-6} per year for requiring physical barrier protection.

The licensee further performed evaluations to determine the probability of events of various missile-related failures that can cause a loss of suction to the RCIC and HPCS. The licensee concluded that the following combination of events must occur at the same time for the above failure to be of concern:

a. An event occurs causing an initiation of RCIC and/or HPCS, and

b. A tornado strikes CPS with the intensity to propel a missile and strike the RCIC (or HPCS) piping in such a way that the RCIC (or HPCS) pump suction is lost prior to the low water level transfer point.

Because of the above failure that must occur, the event of concern (i.e., the occurrence of an event or transient involving RCIC and/or HPCS initiation and a loss of adequate suction that could lead to HPCS and/or RCIC failure) has a very low probability. The licensee stated that the probability of this event was estimated to be less than 1×10^{-6} per year.

Based on the evaluation described above, the licensee proposed the following changes to the USAR:

a. USAR Table 3.2-1, “Classification of Systems, Structures, and Components,” will be revised to reflect the quality and safety classification of the piping between the RCIC storage tank and the fuel building.

b. USAR Sections 5.4.6.1.4, “Physical Damage,” and 6.3.2.6, “Protection Provisions,” will be revised to reflect that RCIC piping between the RCIC storage tank and the fuel building is not provided with physical protection from tornado missiles.

c. USAR Sections 5.4.6.2.4, “System Reliability Considerations,” and 6.3.1.1.3, “ECCS Requirements for Protection from Physical Damage,” will be revised to indicate that the HPCS and RCIC piping inside the fuel building, auxiliary building and containment building are physically separated and protected from damage.

Based on its review, the staff concurs with the licensee that no physical protection barriers are required for this piping (HPCS and RCIC suction lines, and the RCIC storage tank level instrumentation line) between the fuel building and the RCIC storage tank. Also, the staff finds the above changes to the USAR appropriately reflect CPS’s conformance to regulatory guides and the systems/components not required complete TGM protection barriers. Therefore, the staff finds them acceptable.

4.0 SUMMARY

Based on its review and the evaluation described above, the staff finds that the licensee’s proposed changes to the CPS USAR concerning the requirements for physical protection from tornado generated missiles for safety-related systems/components and the methodology used to determine which systems/components require physical protection from TGMs are acceptable.

5.0 STATE CONSULTATION

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

6.0 ENVIRONMENTAL CONSIDERATION

Pursuant to 10 CFR 51.21, 51.32, and 51.35, an Environmental Assessment and Finding of No Significant Impact has been prepared and published in the Federal Register on February 2, 2000 (65 FR 5001). Accordingly, based upon the Environmental Assessment, the Commission has determined that the issuance of this amendment will not have a significant effect on the quality of the human environment.

7.0 CONCLUSION

The staff 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: D. Shum

Date: February 29, 2000