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April 25, 2000

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

SUBJECT: ISSUANCE OF AMENDMENT - CLINTON POWER STATION, UNIT 1 (TAC NO. MA3888)

Dear Mr. Reandeau:

The U.S. Nuclear Regulatory Commission (Commission) has issued the enclosed Amendment No.127 to Facility Operating License No. NPF-62 for the Clinton Power Station, Unit 1. The amendment is in response to the application dated October 23, 1998, filed by Illinois Power Company (IP), the licensee at that time, as supplemented, February 22, and June 24, 1999, and March 31, 2000. Subsequent to the initial application, AmerGen Energy Company, LLC, the current licensee, adopted the license amendment requests submitted by IP.

The amendment allows implementation of a feedwater leakage control system to address leakage through the primary containment feedwater penetration valves.

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.127 to NPF-62
2. Safety Evaluation

cc w/encls: See next page

* See previous concurrence.

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UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

April 25, 2000

Mr. Mike Reandeau
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Clinton, IL 61727

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UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

AMERGEN ENERGY COMPANY, LLC

DOCKET NO. 50-461

CLINTON POWER STATION, UNIT 1

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 127
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 October 23, 1998, as supplemented February 22 and June 24, 1999, and March 31, 2000, 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.

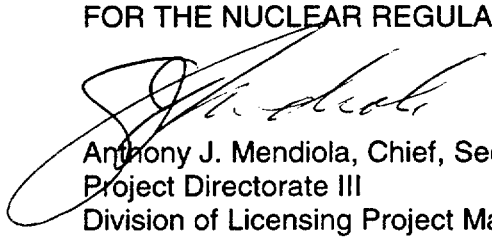
2. Accordingly, the license is amended by changes to the Technical Specifications as indicated in the attachment to this license amendment, and paragraph 2.C.(2) of Facility Operating License No. NPF-62 is hereby amended to read as follows:

(2) Technical Specifications and Environmental Protection Plan

The Technical Specifications contained in Appendix A and the Environmental Protection Plan contained in Appendix B, as revised through Amendment No.127, are hereby incorporated into this license. AmerGen Energy Company, LLC shall operate the facility in accordance with the Technical Specifications and the Environmental Protection Plan.

3. This license amendment is effective as of its date of issuance, and shall be implemented at the earliest opportunity before startup from the first shutdown following issuance.

FOR THE NUCLEAR REGULATORY COMMISSION



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

Attachment: Changes to the Technical Specifications

Date of Issuance: April 25, 2000

ATTACHMENT TO LICENSE AMENDMENT NO. 127

FACILITY OPERATING LICENSE NO. NPF-62

DOCKET NO. 50-461

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

Remove Pages	Insert Pages
3.6-19a	3.6-19a
–	3.6-27a
–	3.6-27b
3.6-33	3.6-33

SURVEILLANCE		FREQUENCY
SR 3.6.1.3.11	Verify each instrumentation line excess flow check primary containment isolation valve actuates within the required range.	18 months
SR 3.6.1.3.12	----------NOTE---------- Only required to be met in MODES 1, 2, and 3. ---------- Verify that the combined leakage rate for both primary containment feedwater penetrations is $\leq$ 3 gpm when pressurized to $\geq$ 1.1 P_a.	18 months

3.6 CONTAINMENT SYSTEMS

3.6.1.9 Feedwater Leakage Control System (FWLCS)

LCO 3.6.1.9 Two FWLCS subsystems shall be OPERABLE.

APPLICABILITY: MODES 1, 2, and 3.

ACTIONS

CONDITION	REQUIRED ACTION		COMPLETION TIME
A. One FWLCS subsystem inoperable.	A.1	Restore FWLCS subsystem to OPERABLE status.	30 days
B. Two FWLCS subsystems inoperable.	B.1	Restore one FWLCS subsystem to OPERABLE status.	7 days
C. Required Action and associated Completion Time not met.	C.1	Be in MODE 3.	12 hours
	AND		
	C.2	Be in MODE 4.	36 hours

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.6.1.9.1	Perform a system functional test of each FWLCS subsystem.	18 months

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SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.6.2.3.1	Verify each RHR suppression pool cooling subsystem manual, power operated, and automatic valve in the flow path that is not locked, sealed, or otherwise secured in position is in the correct position or can be aligned to the correct position.	31 days
SR 3.6.2.3.2	Verify each RHR pump develops a flow rate $\geq$ 4550 gpm through the associated heat exchanger to the suppression pool.	In accordance with the Inservice Testing Program

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO AMENDMENT NO.127 TO FACILITY OPERATING LICENSE NO. NPF-62

AMERGEN ENERGY COMPANY, LLC

CLINTON POWER STATION, UNIT 1

DOCKET NO. 50-461

1.0 INTRODUCTION

The previous licensee, Illinois Power Company (IP), for the Clinton Power Station (CPS) proposed a license amendment to allow implementation of a feedwater leakage control system (FWLCS) by letter dated October 23, 1998, as supplemented February 22 and June 24, 1999, and March 31, 2000. By letter dated February 1, 2000, AmerGen Energy Company, LLC, the current licensee, adopted the license amendment requests submitted by IP. The supplemental letters did not change the scope or nature of the proposed amendment as described in the notice published in the Federal Register (63 FR 64118), or affect the proposed no significant hazards consideration finding.

CPS has had difficulty meeting the air leakage test requirement for the feedwater (FW) penetration isolation valves to ensure penetration leakage post-loss-of-coolant-accident (post-LOCA) is within limits to meet radiation dose requirements. Therefore, CPS desires to implement a FWLCS to provide an enhanced means of isolating the FW penetrations post-LOCA, and to save licensee resources. With the operation of the FWLCS, the periodic leakage testing requirement for the primary containment FW penetration isolation valves would be a water leakage test in lieu of the presently required air leakage test.

The design basis LOCA for CPS was re-evaluated to include an added leakage pathway due to the proposed FWLCS. In addition, two other changes are being proposed to the dose assessment model described in Chapter 15 of the CPS Updated Safety Analysis Report (USAR) to support the implementation of the FWLCS and the associated proposed Technical Specification (TS) changes. The first is the use of dose conversion factors given in International Commission on Radiological Protection (ICRP) Publication 30 for calculating thyroid inhalation doses, and the second is taking credit for removal of iodine by suppression pool scrubbing.

2.0 EVALUATION

2.1 FWLCS Design

FWLCS consists of two independent trains, one supplied from residual heat removal system (RHR) train "A," and the other supplied from RHR train "B." Only one train of FWLCS is needed

to perform its safety function of providing a water seal for the FW penetrations. The licensee has determined that 40 minutes is needed to create the water seal, based in part, on an assumed back leakage of 3 gallons per minute (gpm). Manual operation is necessary to initiate the FWLCS. The licensee states that FWLCS will be initiated approximately 20 minutes post-LOCA. Therefore, it will be one hour post-LOCA before a complete water seal is established.

Implementation of the FWLCS establishes a new operating mode of the RHR system (the FWLCS mode). The licensee has evaluated the impact of the FWLCS mode of RHR on the other modes of the RHR system. Three modes of RHR can operate concurrently with the FWLCS mode. These are the low pressure coolant injection (LPCI), containment spray, and suppression pool cooling modes. The licensee performed calculations which demonstrated that existing LPCI and containment spray head and flow requirements would still be met with the FWLCS mode in operation. However, it was identified by the licensee during the design process that little margin existed in the flow requirements of the suppression pool cooling mode (5050 gpm). Subsequently, the licensee completed a plant modification to the shutdown service water system which supplies emergency cooling water to the RHR heat exchangers and conducted tests of the heat removal capability of the RHR heat exchangers. As a result, the licensee has proposed to reduce the RHR suppression pool cooling flow rate requirement to 4550 gpm. Based on this proposed flow rate, the licensee has performed an analysis which determined that adequate heat removal capability exists to allow FWLCS operation while the suppression pool cooling mode of RHR is in operation.

The licensee states that the FWLCS electrical design meets the requirements for failure of a single active component, redundancy, and separation. Interlocks are included in the FWLCS controls to prevent injection until FW pressure has decayed to an acceptable level, and to prevent inadvertent operation of the system.

2.2 Water/Air Leakage Relationship

The licensee shop-tested a spare 20-inch check valve to determine the relationship between air and water leakage through a FW check valve. This relationship would then be used for radiation dose analysis for the first hour post-LOCA. Test pressure was equal to or greater than the design basis peak containment pressure of 9.0 psig. Actual test temperature and pressure were normalized to containment LOCA conditions of 200 degrees F and 9.0 psig. The air actuator which is used to assist in closing the valve was disabled during the tests for conservative results.

Over 25 sets of air and water leakage data were obtained for different leakage rates up to 6 gpm of water leakage. A plot of the data shows a reasonable linear relationship of air leak rate to water leak rate over the range of data. The licensee performed a statistical analysis assuming a linear relationship to find an air leakage rate value for dose evaluations equivalent to a water leakage rate at the 99.8% confidence level. This value is 8.64 cfm, equivalent to 1.5 gpm.

Although the NRC staff does not typically accept water-to-air leakage rate correlations, the staff finds this correlation acceptable, because of its narrow application to a small set of valves, for only one hour in a 30-day period, and because of the empirical basis of the conversion factor.

2.3 Radiation Dose Analysis

The licensee performed an evaluation of the design basis LOCA including the new release pathway caused by the proposed FWLCS. For this new pathway, the licensee assumed 3 gpm water leakage through the feedwater check valves, occurring over the entire time for the accident (0-30 days). The licensee also modeled a constant air leakage equivalent to 3 gpm of water leakage (i.e., 17 cubic feet per minute air leakage) through feedwater containment penetrations until the FWLCS water seals them (0-1 hr). Both these new leakage releases are released unfiltered through the plant stack directly to the environment.

The licensee also made changes to the calculational methodology to (1) use ICRP-30 dose conversion factors and (2) take credit for removal of iodine by scrubbing in the suppression pool. The NRC staff has generally accepted the use of ICRP-30 dose conversion factors, and such use is consistent with current industry standards. Standard Review Plan (SRP) Section 6.5.5 gives guidance on assumptions and methodology that the NRC staff finds acceptable for a licensee to allow credit for fission product scrubbing and retention by the suppression pool. SRP 6.5.5 states that if the time-integrated decontamination factor values claimed by the applicant for removal of particulates and elemental iodine are 10 or less for a Mark II or a Mark III containment, or are 5 or less for a Mark I containment, the applicant's values may be accepted without any need for the staff to perform calculations. Clinton has a Mark III containment, and the effective decontamination factor used by the licensee is less than 10, therefore, the staff finds it acceptable as stated in SRP 6.5.5. The staff also found the pool bypass fraction determined by the licensee to be acceptable, according to guidance in SRP 6.5.5. The staff determined that the licensee applied the guidance in SRP 6.5.5 correctly to the design of the Clinton plant.

The staff reviewed the assumptions the licensee used in the LOCA dose analyses (Table 1) and found them acceptable. The staff performed LOCA dose calculations using the licensee's assumptions, and confirmed the licensee's results. Therefore, the staff finds acceptable the licensee's evaluation of the design basis LOCA, including the added release pathway due to the proposed FWLCS. The staff notes the licensee's calculated dose consequences due to the addition of the proposed FWLCS (Table 2) do not exceed the acceptance criteria given in 10 CFR Part 100 for offsite dose to members of the public and 10 CFR 50, Appendix A, GDC-19 for dose to personnel in the control room, therefore, the change is acceptable from a radiological standpoint.

2.4 Technical Specification

FWLCS will be required to be operable in Modes 1, 2, and 3. FWLCS will not be required to be operable in Modes 4 and 5 due to the pressure and temperature limitations of those Modes. The licensee proposes an allowed out-of-service time of 30 days for one FWLCS subsystem inoperable, and a time of 7 days to make one subsystem operable, if both subsystems are inoperable. Performance of a system functional test and penetration leakage tests will be required every 18 months. The proposed TS is consistent with TS 3.6.1.8, "Main Steam Isolation Valve Leakage Control System," is appropriate for a FWLCS, and is acceptable to the NRC staff.

Additionally, the required RHR flow rate during suppression pool cooling mode will be decreased from at least 5050 gpm to at least 4550 gpm. The licensee determined by analysis that 4550 gpm of flow is sufficient to maintain the suppression pool temperature within limits during accident conditions, and that adequate heat removal capability exists to allow FWLCS operation concurrent with suppression pool cooling operation. The NRC staff finds this change to the TS to be acceptable.

2.5 Summary

The staff has determined that the system design and analysis performed by the licensee to support the proposed addition of a FWLCS for the feedwater penetrations are acceptable. All calculated offsite and control room doses due to the proposed change meet the acceptance criteria given in the regulations, and the proposed TS are appropriate for the FWLCS. Therefore, the staff finds the proposed amendment acceptable. Because FWLCS implementation needs to be performed during a plant shutdown, the license amendment shall be implemented during the first plant shutdown following issuance.

3.0 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.

4.0 ENVIRONMENTAL CONSIDERATION

This amendment changes a requirement with respect to installation or use of a facility component located within the restricted area as defined in 10 CFR Part 20 or changes a surveillance requirement. 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 (63 FR 64118). 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.

5.0 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 Contributors: M. Hart
J. Hopkins

Date: April 25, 2000

Table 1
Licensee analysis assumptions

1. 100% of the noble gases and 25% of the iodines of the core inventory are instantaneously airborne in the drywell and are available for release to the environment. When credit is taken for suppression pool scrubbing (DF=6.667, 0.0158 pool bypass fraction), the iodine is reduced to 15% of this 25% (3.75% of total core iodine inventory).

2. No mixing in the secondary containment.

3. Containment and Main Steam Isolation Valve (MSIV) source terms are uniformly mixed in the drywell and primary containment free volumes.

4. During the drawdown time (300 sec) all the leakage is released unfiltered, i.e., 100% Standby Gas Treatment System (SGTS) bypass.

5. MSIV leakage starts two (2) hours after shutdown and 100% of the MSIV leakage is filtered by the SGTS.

6. After drawdown time is reached (300 sec), 92% of the containment leakage is filtered by the SGTS and 8% of the containment leakage bypasses the secondary containment and the SGTS.

7. Because of the height of the SGTS stack with respect to the containment building, releases from this pathway are at ground level.

8. Containment atmosphere leaks at a constant rate through the feedwater isolation valves equal to the tested leak rate of the feedwater check valves until the feedwater line is filled (1 hour).

9. The leakage through the feedwater valves is released unfiltered from the plant stack, which is co-located with the SGTS stack. Therefore, the atmospheric dispersion factors (X/Qs) for the SGTS are used for these releases.

10. Suppression pool water is conservatively assumed to leak through the feedwater check valves from the beginning of the accident for 30 days.

11. The suppression pool source is 50% of the core inventory of iodines uniformly distributed in a volume of water equal to the minimum suppression pool volume (146,400 ft^3).

12. A partition factor of 73.4 is used for the iodine in the suppression pool water, i.e., 1.36% of the activity in the suppression pool water that leaks through the feedwater isolation valves becomes airborne and is available for release from the plant. [partition factor (iodine partition coefficient) based on ORNL-TM-2412].

13. The containment pressure and temperature are assumed to be 9 psig and 200°F, respectively, for the entire period of the accident.

Table 1 (cont.)
Licensee analysis assumptions

14. The control room filtered inleakage is 650 cfm. This is consistent with Section 15.6.5.5.3 of the FSAR.

15. The duration of the accident is 30 days.

16. The suppression pool water temperature is assumed to be 80°C (176°F). This is consistent with Figure 2.8 of the FSAR.

17. The control room emergency ventilation system is assumed to have single failure and manual start 20 min after the onset of the accident.

18. There is a constant 10 cfm unfiltered inleakage into the control room.

19. The filtered and unfiltered leakage enter the control room at the make-up inlet, i.e., the same atmospheric dispersion factor (X/Q) as the make-up flow rate is applicable.

20. Control room ventilation data same as FSAR with exception of 20 min delay to start.

21. 0.65%/day containment leak rate to the environs for the first 188 seconds, and 0.052%/day thereafter.

22. Containment Free Volume = 1.512E+06 ft^3.

23. Drywell Free Volume = 241,000 ft^3.

24. MSIV leak rate = 28 SCFH/line.

25. Suppression Pool Water Volume = 146,400 ft^3 (TS min).

26. Secondary Containment Bypass Fraction = 8%.

27. 300 sec drawdown time.

Table 2
Licensee dose results

	EAB	LPZ	10CFR100 Acceptance Criteria
Thyroid	225	86.0	300
Whole Body	11	3.5	25

	CR	GDC-19 Acceptance Criteria
Thyroid	25.0	30
Whole Body	3.0	5
Beta Skin	14.3	30