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RS-02-005

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U. S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, DC 20555-0001

Clinton Power Station, Unit 1
Facility Operating License No. NPF-62
NRC Docket No. 50-461

Subject: Additional Mechanical Systems Information Supporting the License Amendment Request to Permit Uprated Power Operation at Clinton Power Station

References: (1) Letter from J. M. Heffley (AmerGen Energy Company, LLC) to U.S. NRC, "Request for License Amendment for Extended Power Uprate Operation," dated June 18, 2001

(2) Letter from J. B. Hopkins (U.S. NRC) to O. D. Kingsley (Exelon Generation Company, LLC), "Clinton Power Station, Unit 1 – Request For Additional Information (TAC No. MB2210)," dated November 14, 2001

(3) Letter from K. R. Jury (Exelon Generation Company) to U.S. NRC, "Additional Mechanical Systems Information Supporting the License Amendment Request to Permit Uprated Power Operation at Clinton Power Station," dated December 7, 2001

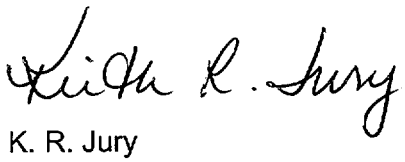
In Reference 1, AmerGen Energy Company (AmerGen), LLC submitted a request for changes to the Facility Operating License No. NPF-62 and Appendix A to the Facility Operating License, Technical Specifications (TS), for Clinton Power Station (CPS) to allow operation at an uprated power level. The proposed changes in Reference 1 would allow CPS to operate at a power level of 3473 megawatts thermal (MWt). This represents an increase of approximately 20 percent rated core thermal power over the current 100 percent power level of 2894 MWt. The NRC, in Reference 2 requested additional information regarding the proposed changes in Reference 1. Reference 3 provided the requested information. The NRC, in a conference call, requested additional follow-up information regarding the information provided in Reference 3. The attachment to this letter provides the additional follow-up information.

A001

Rec'd 01/09/02

Should you have any questions related to this information, please contact Mr. Timothy A. Byam at (630) 657-2804.

Respectfully,



K. R. Jury
Director – Licensing
Mid-West Regional Operating Group

Attachments:

Affidavit
Attachment: Additional Mechanical Systems Information Supporting the License Amendment Request to Permit Uprated Power Operation at Clinton Power Station

cc: Regional Administrator – NRC Region III
NRC Senior Resident Inspector – Clinton Power Station
Office of Nuclear Facility Safety – Illinois Department of Nuclear Safety

STATE OF ILLINOIS	)	
COUNTY OF DUPAGE	)	
IN THE MATTER OF	)	
AMERGEN ENERGY COMPANY, LLC	)	**Docket Number**
CLINTON POWER STATION, UNIT 1	)	**50-461**

SUBJECT: **Additional Mechanical Systems Information Supporting the License Amendment Request to Permit Uprated Power Operation at Clinton Power Station**

AFFIDAVIT

I affirm that the content of this transmittal is true and correct to the best of my knowledge, information and belief.

Keith R. Jury

K. R. Jury
Director – Licensing
Mid-West Regional Operating Group

Subscribed and sworn to before me, a Notary Public in and for the State above named, this 8th day of January, 2002.

Timothy A. Byam
Notary Public

ATTACHMENT

Additional Mechanical Systems Information Supporting the License Amendment Request to Permit Uprated Power Operation at Clinton Power Station

Question 1

In response to RAI Question 10.16, the licensee specifies several impacts of the uprated power conditions that were evaluated regarding the performance of motor-operated valves (MOVs) within the scope of Generic Letter (GL) 89-10, "Safety-Related Motor-Operated Valve Testing and Surveillance." The licensee states that operation at uprated power levels does not affect the ability of the GL 89-10 MOVs to perform their design function, but that some MOVs were found to have reduced margins as a result of the power uprate. The licensee is requested to clarify (1) the effect of the power uprate on differential pressure, flow, temperature, system pressure, and environmental conditions related to safety-related MOV functions: (2) any necessary revision of the MOV capability calculations such as any changes in valve factor or application of the Electric Power Research Institute (EPRI) MOV Performance Prediction Methodology; and (3) any loss of MOV capability margins from the power uprate resulting in planned short-term or long-term actions.

Response 1

The Clinton Power Station (CPS) evaluation of the impact of Extended Power Uprate (EPU) on GL 89-10 MOVs included a review of line pressure, differential pressure, flow rate, and fluid temperature used in the specific calculations. The MOV capability (stem thrust/torque) calculations were also reviewed to determine the impact from changes in differential pressure, line pressure, flow rate, fluid temperature, and environmental conditions. The following items summarize the impacts identified from these reviews.

- Review of the MOV differential pressure calculations identified a number of valves that use the post-accident transient pressure curve (i.e., CPS Updated Safety Analysis Report (USAR) Figure 5.2-7A) to determine the maximum differential pressure. The calculations for these valves used a peak pressure based on this curve. As stated in the CPS response to RAI question 10.16, the EPU project was developed around the performance of individual task reports covering all plant systems and EPU specific analyses and programs. These task reports document a comprehensive evaluation in each of the subject areas of the effects of power uprate. Review of the EPU task reports identified the new peak pressure to be in excess of the value assumed in the current differential pressure calculations. As a result, there is an increase in the differential pressure and line pressure due to EPU for both opening and closing the valves evaluated using the post-accident transient pressure curve. While the margin in the required thrust to open or close these valves is reduced by the increased peak transient pressure, review of the calculations for these valves determined that the operability of the valves is not affected by power uprate. There is adequate margin remaining for the valves to perform their required function.

- The peak containment pressure for EPU is less than the value used in the current MOV calculations. Therefore, there is additional margin in the current analysis for the valves that use the peak containment pressure as input since the calculations have not been revised to use the power uprate containment pressure.

- It was determined that the maximum differential pressure between the drywell and containment is higher for EPU conditions than for the current MOV calculations. The MOVs that use this differential pressure as input have sufficient margin in the required thrust necessary to open or close the valve to accommodate the additional pressure. Therefore, the increased differential pressure associated with power uprate does not affect the operability of these valves.

- The flow rates for the MOVs that would be considered for water inertia (i.e., water is the fluid medium and safety function is to close) do not increase for power uprate. Therefore, the water inertia evaluated in the current calculations are not affected.

- The change in maximum ambient temperature for the various EQ zones associated with EPU does impact the MOV calculations. The maximum ambient temperature will increase as a result of EPU. The small increase in ambient temperature will result in a decrease in the motor capability. The valves that are affected have adequate margin in the motor capability such that the rise in ambient temperature does not impact the operability of the valves.

The valve factors used in the capability calculations are not affected since the fluid temperatures and differential pressure have not changed significantly. In addition, CPS has not applied the EPRI Performance Prediction Methodology to any of the MOVs. Therefore, there is no need to revise the MOV capability calculations, there was no loss in MOV capability margin associated with power uprate, and no need for long- or short-term actions.

Question 2

The licensee states that air-operated valves (AOVs) were evaluated and no required changes were identified. The licensee is requested to clarify (1) the effect of the power uprate on differential pressure, flow, temperature, and system pressure on safety-related AOV functions; (2) any necessary revision of the AOV capability calculations; and (3) any loss of AOV capability margins from the power uprate resulting in planned short-term or long-term actions.

Response 2

The CPS power uprate evaluations were performed predominately on a system basis. AOVs were evaluated as part of their respective systems for changes in operating parameters that would require valve modifications or changes in capability calculations. As the CPS power uprate is a constant pressure uprate, most safety-related systems had little or no change in operating parameters or requirements including differential pressure, temperature, flow, and system pressure. This resulted in no required physical changes to AOVs. AOVs that have a containment isolation function were evaluated as a component group for the containment isolation function. Although no system changes were applicable, the calculated peak containment pressure did change for power uprate. A review of the capability calculations for these AOVs indicates that the original calculations were performed using containment design pressure as the input. As the

power uprate peak containment pressure does not exceed design, no capability calculation revisions were necessary for these valves.

An additional review of AOVs with a drywell isolation function was also performed due to the calculated change in drywell peak pressure. The capability calculations for drywell isolation AOVs used the pre-uprate calculated pressure as the input to the calculation, rather than the design pressure as used in the containment isolation valves. Therefore, the capability calculations for three drywell isolation AOVs require revision. No physical change to the valves will be required due to this revision.

Question 3

The licensee states that safety and relief valves were evaluated and no required changes were identified. The licensee is requested to clarify (1) the evaluation of the operating requirements for these valves in terms of pressure, temperature, and flow rate; and (2) any adjustments to the valves or increased monitoring as a result of the power uprate conditions.

Response 3

As noted in the response to Question 2 above, the CPS power uprate evaluations were performed predominantly on a system basis. Safety and relief valves were evaluated as part of their respective systems for changes in operating parameters that would require valve modifications or changes in calculations. As the CPS power uprate is a constant pressure uprate, most safety-related systems had little or no change in operating parameters or requirements including pressure, temperature, and flow rate. This resulted in no required changes to safety and relief valves or their respective calculations. A specific evaluation was performed to demonstrate conformance to the elements of GL 96-06, "Assurance of Equipment Operability and Containment Integrity During Design Basis Accident Conditions," which included relief valves installed on penetrations to provide overpressure protection for isolated pipe sections. As discussed above for air operated valves, the GL 96-06 calculations were performed using containment design pressures and temperatures, rather than calculated peak accident results. Therefore, there are no required physical changes to safety and relief valves or their respective calculations.

Question 4

The licensee states that, as part of the power uprate evaluation, MOVs within the scope of GL 89-10 had been reviewed to address the recommendations in GL 95-07, "Pressure Locking and Thermal Binding of Safety-Related Power-Operated Gate Valves." The licensee is requested to clarify (1) the effect of the power uprate on the potential for thermal binding or pressure locking, such as caused by temperature increases, on the scope of power-operated valves under GL 95-07 or the performance of those valves; and (2) any modifications or procedure changes necessary as a result of the power uprate to preclude thermal binding and pressure locking.

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Response 4

Based on review of the pressure locking and thermal binding calculations there is no reduction in margin to any of the valves susceptible to pressure locking since the pressure used in these calculations is bounding when compared to the transient pressure calculated for power uprate conditions. The temperatures for the valves that are evaluated for thermal binding are not changed; therefore, the thermal binding analyses are not affected.

Since there are no adverse impacts of power uprate to the current pressure locking and thermal binding analyses, no modifications or procedure changes are required.