July 30, 2001

Mr. Oliver D. Kingsley, President
Exelon Nuclear
Exelon Generation Company, LLC
1400 Opus Place, Suite 500
Downers Grove, IL 60515

SUBJECT: CLINTON POWER STATION, UNIT 1 - EXTENDED POWER UPRATE (TAC NO. MB2210)

The Nuclear Regulatory Commission's (NRC's) staff has received your letter of June 18, 2001, which requested a license amendment for a 20-percent power uprate of the Clinton Power Station. The staff has been performing an acceptance review of your submittal and finds that it is inadequate in addressing the risk and environmental impacts of the uprate.

While your application was not made as a risk-informed submittal, the staff considers risk information as appropriate in its review of plant specific licensing actions. Such a review is conducted when necessary to provide assurance that the requested action does not introduce a significant risk increase. The staff believes that large power uprates are areas where risk impact should be assessed. With regard to environmental considerations, the staff notes that you submitted your power uprate as qualifying for a categorical exclusion in accordance with 10 CFR 51.22(c)(9). The staff performs an environmental assessment for extended power uprate requests, and does not use a categorical exclusion, because at this time, it is policy that the staff does not propose no significant hazards considerations for extended power uprate requests.

In order to continue the review of your application, the staff requests that you submit this information. Enclosed is guidance for your submittal of the needed risk information. With regard to the environmental information, the staff requests that you submit information similar to that provided in Attachment D of the letter dated December 27, 2000, requesting power uprate approval for Dresden and Quad Cities Nuclear Power Stations.

Considering the aggressive schedule you requested for completing review of this application, the staff requests that you submit this information no later than 60 days within the date of this letter.

Contact me if you have any questions.

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

Enclosure: Extended Power Uprate
Request

cc w/encl: See next page

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Jon B. Hopkins, Senior Project Manager, Section 2
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Docket No. 50-461

Enclosure: Extended Power Uprate Request

cc w/encl: See next page

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CLINTON POWER STATION

EXTENDED POWER UPRATE REQUEST

The following items are provided to help identify the necessary information to support the staff review of the PRA aspects of the Clinton Power Station extended power uprate:

1. An appropriate risk impact guideline for the licensee to use should be that provided by RG 1.174 or an equivalent approach that ensures that the extended power uprate has risk impacts meeting the specified guidelines (e.g., ΔCDF less than 1E-5 and ΔLERF less than 1E-6 and no potential vulnerabilities identified from a margins-type analysis). The intent of this assessment is to show that any risk increase associated with the extended power uprate is acceptably small.

2. The discussion relating to the PRA aspects should explicitly address each of the following areas:

    a. PRA quality (including a discussion on how the PRA models and supporting analyses reflect how the plant will be operated and configured for the post-uprate plant conditions and, if there has been an industry peer review, what findings were identified that need to be considered and addressed as part of the PRA models and analyses used to support the power uprate).

    b. Impacts on initiating event modeling and frequencies and associated data tracking (including a discussion explaining if there are any impacts or why there are none and providing the affected pre- and post-uprate initiating event frequency values).

    c. Impacts on component and system reliability and response times and associated performance data tracking (including a discussion explaining if there are any impacts or why there are none and providing the affected pre- and post-uprate component and system reliability values and/or response times).

    d. Impacts on operator response times and associated error probabilities (including a discussion explaining if there are any impacts or why there are none and providing the affected pre- and post-uprate available response times and error probabilities values).

    e. Impacts on functional and system-level success criteria and how the success criteria was re-evaluated (including a discussion explaining if there are any impacts or why there are none and providing the affected pre- and post-uprate success criteria).

    f. Overall changes in CDF and LERF values (including a discussion explaining if there are any impacts or why there are none and providing the pre- and post-uprate CDF and LERF values and justification of their acceptability as being small).

g. Impacts on other modes of operations (e.g., shutdown risk - including a discussion explaining if there are any impacts or why there are none and providing the affected pre- and post-uprate CDF and LERF values or, if no values are available, estimates of the impact and a justification as to the acceptability of its risk impact).

h. Impacts of external events (including a discussion explaining if there are any impacts or why there are none and providing the affected pre- and post-uprate CDF and LERF values or, if no values are available, estimates of the impact, considerations of potential vulnerabilities, outliers, anomalies, etc. identified as part of margins-type approaches, and a justification as to the acceptability of its risk impact).

i. Impacts on the PRA from any other areas affected by the power uprate or being implemented in parallel with the power uprate (e.g., emergency operating procedure changes, changes in maintenance activities or approach, turbine trip setpoint changes, turbine bypass capability, condensate/feedwater modifications or operational changes, main transformer modifications, increased burnup, longer cycles, etc. - including a discussion explaining if there are any impacts or why there are none and if there are impacts that are not reflected in the uprated plant PRA models, how those impacts were considered and why they are acceptable).

In addressing the above topics, the licensee should also discuss their PRA supporting analyses (e.g., thermal-hydraulic modeling changes to reflect post-uprate plant operations, setpoints, and conditions) to provide assurance that the impacts of the power uprate were appropriately identified, considered, and analyzed. In addition, the licensee should discuss the potential for synergistic effects resulting from the power uprate and other plant changes being implemented, uncertainties, and traditional engineering considerations, such as defense-in-depth and safety margins.

For example, if there is a plant modification associated with the uprate that may affect an initiating event (e.g., addition of automatic recirculation system runback on feedwater pump trip), then the initiating event (e.g., loss of feedwater) may need to be explicitly modeled to account for new potential impacts (e.g., spurious runback at full power or failure to runback upon feedwater pump trip). If generic or plant-specific data is used to derive the initiating event frequency, instead of using an explicit model, then the applicability of the data to the new operating conditions will need to be justified. Further, note that the new operating conditions may also impact the top-level, functional plant response (i.e., event tree) modeling. This may then require revising the modeling of and inputs to the best estimate thermal-hydraulic code used to support the development of functional and/or system-level success criteria. The plant-specific submittal would also need to describe these modeling, supporting analyses, and success criteria impacts.

Further, in determining the impacts on success criteria, the licensee should explain how the potential impacts were identified and considered. Were the best-estimate thermal hydraulic codes used in developing the success criteria re-run using the post-uprate power core and plant operating conditions or was only a qualitative review performed?

If the prior, what modeling conditions and input parameters in the best-estimate thermal hydraulic codes used for the post-uprate plant were changed from the pre-uprate plant? Does the post-uprate thermal-hydraulic model reflect the post-uprate plant operations and conditions, including increased fuel burnup, increased heat rejection requirements, setpoint changes, increased flowrates, recirculation pump runback capability, increased number of operating condensate or feedwater pumps, revised pressure and temperature limits, etc.? If the latter, the qualitative review should be described and justified as adequate for the post-uprate plant conditions and operations.

Oliver D. Kingsley

Clinton Power Station, Unit 1
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cc:

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