October 3, 2001

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

SUBJECT: CLINTON POWER STATION, UNIT 1 - REQUEST FOR ADDITIONAL INFORMATION (TAC NO. MB2210)

Dear Mr. Kingsley:

By letter dated June 18, 2001, you submitted a license amendment request for a 20 percent power uprate of the Clinton Power Station. The Nuclear Regulatory Commission staff has performed an initial review of your request and finds that it needs additional information to complete its review.

Therefore, I request that you respond to the enclosed request for additional information by October 17, 2001, for all questions except for 3.1 and 3.2, which can be responded to by October 31, 2001, in order for the staff to complete its review in a timely manner. The questions were discussed and the response dates agreed upon with a member of your staff. Additionally, your staff stated that the questions did not contain proprietary information. The questions are unchanged from those sent by facsimile to a member of your staff on September 7, 2001.

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: As stated

cc w/encl: See next page

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Oliver D. Kingsley

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CLINTON POWER STATION

DOCKET NO. 50-461

EXTENDED POWER UPRATE

REQUEST FOR ADDITIONAL INFORMATION

1.0 Reactor Vessel Fluence

1.1 The 20 percent power increase will result in a neutron source greater than 20 percent. You state in Section 3.3.1 of the submittal that the extended power uprate (EPU) fluence is bounded by the (CLTP) fluence. Please explain the analysis which supports these findings. Was the computer Code used in the fluence calculations approved by the Nuclear Regulatory Commission (NRC) staff?

1.2 From Section 3.3.1(e), the staff concludes that Clinton Power Station (CPS) does not have any plant-specific irradiated material testing. Please describe the calculations used to conclude that the upper shelf energy will remain above 50 ft-lb at the end of the current license.

1.3 It is stated that “The decrease in the EPU fluence despite the increase in the core thermal power was the result of a more realistic lead factors....” Lead factors are normally associated with capsule irradiation, yet CPS has not removed any surveillance capsules. Please explain the meaning of the lead factors discussed in the submittal.

2.0 Human Factors and Operator Performance

2.1 Changes in Emergency and Abnormal Operating Procedures

Describe how the proposed power uprate will change the plant emergency and abnormal procedures.

2.2 Changes to Risk-Important Operator Actions Sensitive to Power Uprate

Describe any new risk-important operator actions required as a result of the proposed power uprate. Describe changes to any current risk-important operator actions that will occur as a result of the power uprate. Explain any changes in plant risk that result from changes in risk-important operator actions.

(i.e., Identify and describe operator actions that will require additional response time or will have reduced time available. Your response should address any operator workarounds that might affect these response times. Identify any operator actions that are being automated as a result of the power uprate. Provide justification for the acceptability of these changes).

ENCLOSURE

2.3 Changes to Control Room Controls, Displays and Alarms

Describe any changes the proposed power uprate will have on the operator interfaces for control room controls, displays and alarms. For example, what zone markings (e.g. normal, marginal and out-of-tolerance ranges) on meters will change? What set points will change? How will the operators know of the change? Describe any controls, displays, alarms that will be upgraded from analog to digital instruments as a result of the proposed power uprate and how operators were tested to determine they could use the instruments reliably.

2.4 Changes on the Safety Parameter Display System

Describe any changes the proposed power uprate will have on the safety parameter display system. How will the operators know of the changes?

2.5 Changes to the Operator Training Program and the Control Room Simulator

Describe any changes the proposed power uprate will have on the operator training program and the plant reference control room simulator, and provide the implementation schedule for making the changes.

3.0 Reactor Systems Branch - Maine Yankee Lessons Learned

3.1 The submittal included proposed changes to the technical specification. However, the submittal did not provide any matrix or plan indicating which sections of the updated safety analysis report (USAR) will be superseded by current extended power uprate re-analysis. Provide a list or matrix that identifies which subsections of the USAR will be superseded and identify the corresponding sections of the current submittal. The actual updating of the USAR will be governed by the current regulations; however, the effected USAR subsections should be revised and documented.

3.2 Ref. Attachment E- Table 1-3 lists all the nuclear steam system supplier Computer codes used for EPU. Respond to the following requests which pertain to the codes used in the power uprate.

(a) Review the approving safety evaluation report (SER) for each code and state whether your application of the code complies with any limitations, restrictions or conditions specified in the approving SER. Demonstrate that your applications of the computer codes in the re-analysis conforms with all assumptions and restrictions given by the corresponding approving SER.

(b) In addition, review the SERs for the EPU generic reports and indicate if you complied with all restrictions stated in the approving SER.

3.3 Confirm that AmerGen performed technical/quality assurance audits of General Electric Company support for CPS EPU application.

4.0 Radiological Consequences

4.1 In order to make a finding regarding the acceptability of the proposed EPU, the staff must make a finding in regard to offsite doses (10 CFR 100.11) and control room doses (10 CFR Part 50 Appendix A, GDC-19). The submittal only addresses control room doses for the design-basis accident (DBA) loss-of-coolant accident (LOCA). No discussion of the EPU impact on the control room doses for the other DBAs is provided.

a. Since GDC-19 requires that adequate radiological protection be provided for all accidents, including the LOCA, please provide a statement regarding the acceptability of the EPU impact on control room habitability for all DBA's currently analyzed for CPS (i.e., that GDC-19 will be met for all accidents in the CPS design basis).

b. If your position is that the control room dose for a LOCA is bounding, that statement should be made in your docketed response. In support of this position, please provide a basis for this conclusion. Include in your justification (1) the impact of different release modes (e.g., ground level vs elevated releases) for the various accidents, (2) the impact of release point location in relation to the control room intake for the various accidents, (3) differences in release pathway filtration and other mitigation, and (4) differences in the means and timing of the actuation of control room isolation/filtration. The NRC staff's experience in reviewing license amendment requests indicates that these considerations can often make other accidents more limiting with regard to control room habitability.

4.2 Table 9-2 provides the dose results for the LOCA. The doses identified in this table as "current" are different from the values documented in Table 15.6.5-6 of the CPS USAR.

	USAR Table 15.6.5-6	Table 9-2 Current	Table 9-2 EPU
EAB			
Whole body	4.4	11	13.5
Thyroid	163	225	267
LPZ			
Whole body	1.7	3.5	4.5
Thyroid	156	86	102
Control Room			
Whole body	2	3	3.5
Thyroid	27	25	29

a. Please explain the source of the values identified as "current." Please explain why the exclusion area boundary (EAB) thyroid dose shows an increase of about 40 percent, when the LPZ (low population zone) dose shows a decrease of 45 percent and the control room thyroid dose shows a decrease of about 7 percent. Your submittal did not identify any changes to the design basis that would account for the observed differences in the reported doses.

b. Please provide a tabulation of all EPU analysis inputs and assumptions for the LOCA in sufficient detail to enable the staff to evaluate the acceptability of these assumptions, and as necessary, perform confirming EAB, LPZ, and control room dose calculations.

c. Please identify any changes to prior design basis inputs, assumptions, and methodologies, including offsite and control room atmospheric dispersion coefficients, incorporated in these re-analyses.

d. If the atmospheric dispersion coefficients documented in the USAR were revised, please identify the methodology used and all inputs and assumptions, and provide a computer readable file of the hourly meteorology data or joint frequency data (as appropriate) used in your re-analysis.

e. Please provide a justification for control room unfiltered inleakage assumptions that have not be substantiated by appropriate integrated boundary leakage testing.

4.3 In the NEDC evaluations previously submitted for other boiling-water reactors, core inventories were recalculated using ORIGEN2 to address current fuel design, burnup and enrichment. These discussions note that use of the earlier Ci/MWt values based on TID14844 do not properly account for the difference in U-235 and Pu-239 fission product yields associated with higher burnup fuels. The NRC staff believes this to be a valid concern. The TID14844 values, issued in 1962, reflected the low enrichment, low burnup fuels in use at that time. The staff notes that an NEDC analysis for a 17 percent EPU used a thyroid scaling factor of 26 percent, which is about 30 percent greater than the 20 percent used in the CPS analysis. Please provide an explanation of why the CPS submittal does not address this consideration, and why you believe the revised core inventory is adequately conservative.

4.4 Section 11.4.2.8 of the NEDC report states that the LOCA was reanalyzed and that the increase in the iodine release is nearly proportional to the increase in power level, but the noble gas releases are slightly higher. The document then states that the observed differences for the LOCA were used to scale the remaining DBA doses. The staff believes that this approach, as described, is inappropriate. By basing the scaling factor on the LOCA release rates, you are in effect crediting release mitigation features (e.g., plate out, filtration, etc.) which are appropriate for the LOCA, but may not be appropriate for the remaining accidents to which the scaling factors are applied. The staff believes that the scaling factors need to be developed by multiplying the pre-EPU and post-EPU core inventories by the corresponding dose conversion factors, isotope-by-isotope, summing the isotopic results for each inventory and then calculating the scaling factor from the two sums. This may explain, in part, why the CPS thyroid scaling factor appears low in comparison to those used by other applicants. Please provide a justification for the approach used, or correct the submittal.

4.5 The submittal addressed the EPU impact on the LOCA, main steamline break accident, fuel handling accident, and control rod drop accident. The CPS USAR Chapter 15 addresses a much larger spectrum of accidents with regard to radiological consequences. While the majority of these analyses conclude there are no radiological consequences, there are analyses of accidents other than those addressed in the application for which radiation doses were calculated. Please address the impact of the EPU (source term and transport considerations) on the following CPS-specific analysis results:

15.2.4.5, Main steamline isolation valve closures (cross-referenced by many Chapter 15 sections)
15.6.6.5, Feedwater line break consequences
15.7.1.1, Main condenser offgas treatment system failure