Mr. John K. Wood
Vice President - Nuclear, Perry
FirstEnergy Nuclear Operating Company
P.O. Box 97, A200
Perry, OH 44081

SUBJECT: PERRY NUCLEAR POWER PLANT, UNIT 1 - REQUEST FOR ADDITIONAL INFORMATION RELATED TO LICENSE AMENDMENT REQUESTING POWER UPRATE (TAC NO. MA6459)

Dear Mr. Wood:

The staff is continuing its review of your application dated September 9, 1999 (PY-CEI/NRR-2420L), regarding a proposed power uprate at the Perry Nuclear Power Plant, Unit 1.

In order to evaluate the proposed amendment request, the staff has identified a need for additional information in order to complete their review. The enclosed request for additional information has been forwarded from NRR's Reactor Systems Branch and the Electrical Section of the Electrical and Instrumentation and Controls Branch.

Sincerely,

Douglas V. Pickett, Sr. Project Manager, Section 2
Project Directorate III
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

Docket No. 50-440

Enclosure: As stated

cc w/encl: See next page

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REQUEST FOR ADDITIONAL INFORMATION

TECHNICAL SPECIFICATION CHANGES TO SUPPORT POWER UPRATE

PERRY NUCLEAR POWER PLANT, UNIT 1

DOCKET NO. 50-440

Electrical and Instrumentation and Controls Branch

1. In Section 6.1 of the Perry power uprate submittal, it is noted that an offsite power grid stability uprate review determined the adequacy of the electrical equipment and grid stability. Please provide a concise description of what this grid stability uprate review consisted of and include in this description the major assumptions for this review and the resulting primary review findings and conclusions. In addition, please explain in detail what changes have been made to the relay protection systems for the 345 kV switchyard equipment and how those changes may affect the probability of losing electric power to the unit.

2. Information provided in Section 6.1.1 of the subject submittal notes that the iso-phase bus ratings, the main power transformer ratings, and other associated switchyard component ratings (i.e., the unit and system auxiliary power transformer ratings and the generator current ratings) are adequate for the uprate operating conditions. Please provide the numerical rating values for each of these items and the expected numerical values for these items during operation at power uprated operating conditions. In addition, please explain the technical basis for the increase in the main transformers rating from 1394.4 MVA to 1580 MVA as described by Table 6-1.

3. Provide a discussion that addresses the impact of the power uprates on the load, voltage, and short circuit current values for all levels of the station auxiliary electrical distribution system (including ac and dc).

4. The subject submittal contains a discussion addressing how the proposed power uprate impacts the existing analysis performed for station blackout in Section 9.3.2. Please provide the numerical estimate for the increase in decay heat and associated temperature rise in the plant areas relevant to coping with station blackout conditions and discuss the potential impact of additional safety relief valve actuations due to the increased decay heat. Discuss and verify that the results of suppression pool temperature transient analyses show that emergency core cooling (ECCS) equipment will not be adversely impacted given a maximum allowable cooldown rate during the reactor pressure vessel depressurization. In general, quantify the changes including uncertainty bounds to the assumptions for the existing station blackout analysis under the power uprate conditions, particularly as they relate to issues such as heat-up analysis, equipment operability, and battery capacity.

5. In Section 10.3.1.1 of the subject submittal, it is stated that the current accident and normal plant conditions for temperature, pressure, and humidity inside the primary

containment are “effectively unchanged” for the power uprate conditions. Please provide a detailed discussion to clearly explain how the current accident and normal temperature, pressure, and humidity profiles for inside the primary containment do change for the power uprate conditions and why these changes have no impact on the environment qualification of electrical equipment. In addition, please provide a similar discussion for the temperature, pressure, and humidity profiles for high energy line break areas outside of the primary containment.

6. In Sections 10.3.1.1 and 10.3.2 of the subject submittal, it is noted that the environmental qualification radiation levels under accident conditions are conservatively evaluated to increase 5% to 12% inside and outside the primary containment. It is also noted that the reevaluation of the environmental qualification conditions under the uprated power conditions identified some electrical equipment located inside the primary containment and mechanical equipment with non-metallic components which are affected by the higher accident radiation level. Please identify this equipment and discuss how this equipment will be requalified for the new radiation values. Also provide the current, the revised, and bounding radiation level values and provide numerical values for specific equipment exposure under these new radiation conditions.

7. The difference between the allowable value and the analytical limit for the Main Steamline High Flow Isolation (MSHLI) for the uprated power conditions represents a significant improvement in the setpoint determination given the known uncertainties and allowances specified in NEDC-31336, “General Electric Instrument Setpoint Methodology” dated October 1996. For example, NEDC-31336 specifies 1% allowance each for process measurement accuracy [BWR/6] and loop accuracy parameters and 2% allowance each for loop calibration and primary element accuracy parameters. Please provide the calculation of the MSHLI instrument analytical limit and allowable value for the uprated power conditions with the current and revised steam flow, pressure and enthalpy conditions.

Reactor Systems Branch

1. Topical report (Attachment 1 to the submittal) Section 4.3 states that ECCS performance was analyzed using NRC-approved SAFER/GESTR-LOCA methodology. When discussing ECCS performance evaluation methods, the Perry FSAR (Section 6.3.3) references NEDO-20566 (the GE generic LOCA analysis in accordance with Appendix K) but does not reference the SAFER/GESTR-LOCA topical report.

   The topical report also states that other safety analyses used the GEMINI transient analysis methods listed in NEDO-31897.

   a. Identify codes and methods used to obtain or confirm safety limits for the uprated power condition. Include the version and issue date for each item identified. Specifically list when SAFER/GESTR-LOCA was approved for use at Perry and when the associated plant-specific topical report was submitted to the NRC.

   b. Discuss any changes to the codes and methods identified in response to the above that were made since they were approved for use at Perry.

c. Identify and discuss any limitations or conditions imposed upon approval of these methods for use at Perry.

2. Explain how the maximum extended operating domain and 100-percent rod lines were determined on the proposed power-to-flow map. A figure giving the power-to-flow map with both the current and proposed power scales would be helpful for comparison.

3. Provide power-to-flow maps showing the current stability control regions and the regions under power uprate conditions. Explain any differences with the interim corrective actions defined in GE SIL 380 and discussed in NRC Bulletin 88-07 Supplement 1.

4. The citation for Reference 10 in Section 4 of the topical report appears to be incorrect. Confirm that the reference should be NEDC-31984P rather than NEDO-30832A.

5. Attachment 6 to the submittal lists licensee commitments. Commitment number 9 states that safety evaluations are to be revised as necessary to include power uprate conditions. What licensee safety evaluations have been reviewed for suitability to uprated conditions, what safety evaluations have been revised, and what further safety evaluation reviews are planned?

6. Section 2.1 of the topical report states that parametric core design studies for Perry show that the power uprate can be accommodated. Describe the parametric studies and discuss the criteria used to judge that the results were acceptable for power uprate.

7. Summarize the sensitivity analyses discussed in Section 9.1 of the topical report that were conducted to determine the sensitivity of limiting transients to core flow, feedwater temperature, and cycle exposure. Include in the summary what events were considered, the ranges of input variables applied for each event considered, and what conclusions were drawn from the results.

8. What analysis supports the statement in Section 9.2.3 of the topical report that systems used to respond to power restoration after a station blackout can restore suppression pool temperature to technical specification limits?

9. What balance-of-plant modifications are associated with the power uprate?

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ORIGINATOR NAME: Doug Pickett

SECRETARY NAME: Y. Edmonds

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