July 1, 2003

MEMORANDUM TO: Anthony J. Mendiola, Chief, Section 2
Project Directorate III
Division of Licensing Project Management, NRR

FROM: George F. Dick, Jr., Senior Project Manager
Project Directorate III ***/RA/***
Division of Licensing Project Management, NRR

SUBJECT: DOCUMENTATION OF A REQUEST FOR INFORMATION REGARDING THE LICENSED THERMAL POWER LEVEL AT BYRON STATION, UNIT 1 (TAC NOS. MB7319 AND MB7378)

By letter dated January 22, 2003, the NRC informed Exelon Generation Company, LLC, the licensee for Byron Station, it was concerned that Byron, Unit 1 may be operating above its licensed thermal power level. The licensee responded to the NRC letter with a submittal dated February 5, 2003.

During the course of its review, the NRC staff determined that it needed further information and prepared questions to be sent to the licensee. On June 10, 2003, the attached questions were FAXed to the licensee. A discussion of the questions with the licensee was held via a telephone conference call on June 20, 2003. A formal Request for Information is in preparation.

Attachment: As stated

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Questions Regarding Byron, Unit 1 Thermal Power

The NRC staff is reviewing the licensee's response of February 5, 2003, to the NRC's letter of January 22, 2003. During the review, the staff has determined that it requires additional information in order to fully resolve the question of the licensed power limit for Byron Station, Unit 1. The staff's questions or information needs are as follows:

1. Questions specific to the licensee's February 5, 2003, submittal

1.1 On Page 2 and on Page 5, the licensee identified participation by other than on-site personnel in such activities as detailed review of the installation and re-evaluation of the installation uncertainty calculations of the ultrasonic flow meters (UFMs). Please provide an elaboration of the statement, "that the equipment was performing within specification."

1.2 On Page 9, the licensee identified a MWe evaluation and toward the end of the letter, discussed other parameters associated with the plant secondary side. Please provide a description of observations and conclusions obtained during those or any other evaluations, including any items that may be consistent with a thermal power level being greater than 100 percent. Include any observations relative to the turbine/alternator performance, including but not limited to the overall conversion efficiency of the turbine generator with the assumption that the plant is operating at 100 percent thermal power.

2. Questions related to the feedwater flow meters

2.1 Included in topical reports Westinghouse has submitted affirming the accuracy of the AMAG CrossFlow ultrasonic flowmeter at a number of nuclear power plants are comparisons of feedwater flow readings from the UFM with simultaneous readings from the installed venturi-based FW flow meters. Westinghouse notes that the FW venturis tend to defoul upon return to power following an outage, and that the UFM accuracy can, therefore, be confirmed immediately following start-up.

Please provide all available data showing simultaneous readings or correction factor computations for the venturis and the UFMs upon return to power or at other times when the venturis were known to be clean. Please provide the data, showing the degree of correlation between the two types of flowmeters. If such data do not exist, the staff requests that the licensee obtain these data after the next startup. The venturi delta-P instruments should be calibrated before taking data, or supplemented with laboratory-grade devices. Please include uncertainty evaluations for the data measurement and acquisition equipment for both the existing data and new data.

2.2 Please provide a complete description of the methodology used to calculate the correction factors. Include the behavior as a function of power.

2.3 Fluctuations in the CF for Byron appear to be greater than at other plants. It was recommended by Westinghouse to run continuous UFM monitoring for a period of 6 months to possibly identify the root cause of the fluctuations. Please describe how the CF fluctuations at Byron compared with the CF fluctuations at Braidwood, and how indicated power is affected by the level of CF fluctuation. Describe actions that have been taken in response to the Westinghouse recommendation and what was found to

be the root cause of this condition. Discuss the status of corrective actions to resolve this condition, and how the CF fluctuations currently compare between the Byron and Braidwood units.

3. Questions related to the quality of the calorimetric calculations

When comparing comparable units multiple parameters other than the UFM feedwater flowrate instrumentation are biased in a manner that suggests that Byron is operating a thermal power that is greater than Braidwood. The licensee has concluded that this is acceptable for Byron Unit 1 because each of the indications is within the respective uncertainty ranges. More information is needed to support this conclusion. One would not expect that random deviations for multiple parameters, even though individually within expected bounds, would all be in the same direction. Consequently, please provide the following information for Byron Unit 1, Byron Unit 2, Braidwood Unit 1, and Braidwood Unit 2:

3.1 For the time between January 1, 1998, and the present, identify every parameter that was measured that could be used as an input to the calculation or estimation of thermal power or changes in thermal power. For each parameter, (1) identify each instrument or group of instruments that provides the value of the parameter and, (2) identify any dependencies or indicate that the parameter values are statistically independent.

3.2 For conditions corresponding to the predicted characteristics for 100 percent power, provide the results of a statistical analysis that would allow a conclusion to be drawn regarding whether there is, in fact, a statistically significant difference in the power levels between the comparable units. In addition, please provide a discussion of the methodology that was used to do the comparison. Include assumptions and identify any cases where values were adjusted and justify such changes.

3.3 Provide the results of the same type of above analysis for lower power conditions where the information may provide additional insights into operational behavior.

3.4 Based upon the above, provide for Byron 1, estimates of the probability that thermal power does not exceed 100 percent for a minimum of the following four cases: (1) prior to implementation of the UFM instrumentation; (2) prior to implementation of the power uprate with feedwater flowrate determined using the UFM instrumentation; (3) following the power uprate using feedwater flow venturi characteristics that have not been recalibrated by the UFM instrumentation (without the UFM instrumentation); and (4) following the power uprate with feedwater flowrate determined using the UFM instrumentation. Please provide a representative example of the calculations used to determine the estimates.

4. Questions related to other secondary side equipment

4.1 Describe and explain any changes in the turbine efficiencies at Byron prior to and following UFM implementation. Provide the same type of information for Braidwood. Also describe and explain any differences in turbine efficiencies between the Byron and Braidwood Units prior to and following UFM implementation.

4.2 Describe and explain any differences in the turbine governor and throttle valves between the Byron and Braidwood Units. Were these valves originally purchased as identical valves for Byron and Braidwood?

4.3 Were any modifications made to the turbine governor or throttle valves (or to the turbines) prior to, in conjunction with, or subsequent to power uprate?