

June 7, 2010

MEMORANDUM TO: Harold K. Chernoff, Chief
Plant Licensing Branch I-2
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

FROM: Peter Bamford, Project Manager */ra/*
Plant Licensing Branch I-2
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

SUBJECT: LIMERICK GENERATING STATION, UNITS 1 AND 2 - ELECTRONIC
TRANSMISSION, DRAFT REQUEST FOR ADDITIONAL INFORMATION
REGARDING MEASUREMENT UNCERTAINTY RECAPTURE POWER
UPRATE (TAC NOS. ME3589 AND ME3590)

The attached draft request for additional information (RAI) was transmitted by electronic transmission on June 7, 2010, to Mr. Kevin Borton, at Exelon Generation Company, LLC (Exelon). This draft RAI was transmitted to facilitate the technical review being conducted by the Nuclear Regulatory Commission (NRC) staff and to support a conference call (if needed) with Exelon in order to clarify the licensee's submittal. The draft RAI is related to Exelon's submittal dated March 25, 2010, regarding Limerick Generating Station, Units 1 and 2, Measurement Uncertainty Recapture Power Uprate. The draft questions were sent to ensure that they were understandable, the regulatory basis was clear, and to determine if the information was previously docketed. Additionally, review of the draft RAI would allow Exelon to evaluate and agree upon a schedule to respond to the RAI. This memorandum and the attachment do not represent an NRC staff position.

Docket Nos. 50-352 and 50-353

Enclosure: As stated

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REQUEST FOR ADDITIONAL INFORMATION
LIMERICK GENERATING STATION, UNITS 1 AND 2
MEASUREMENT UNCERTAINTY RECAPTURE
POWER UPRATE REQUEST
DOCKET NOS. 50-352 AND 50-353

By letter dated March 25, 2010 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML100850380), Exelon Generation Company, LLC (Exelon) submitted a license amendment request (LAR) proposing to revise the operating license and technical specifications for Limerick Generating Station (LGS), Units 1 and 2. This LAR proposes to implement an increase of approximately 1.65% in rated thermal power from the currently licensed thermal power limit of 3458 megawatts thermal. The increase would be based on the improved thermal power measurement accuracy, which would be achieved through the utilization of the Cameron International (formerly Caldon) CheckPlus™ leading edge flowmeter (LEFM) ultrasonic flow measurement instrumentation. The Nuclear Regulatory Commission (NRC) staff has been reviewing the submittal and has determined that additional information is needed to complete its review.

- (1) Attachment 1 to the application letter dated March 25, 2010, states that the scope and content of the evaluations performed and described in the LAR are consistent with the guidance of NRC Regulatory Issue Summary (RIS) 2002-03, "Guidance on the Content of Measurement Uncertainty Recapture Power Uprate Applications." RIS 2002-03, Attachment I, Section I, Item D.1 asks licensees to discuss maintenance and calibration procedures for the LEFM CheckPlus™ system. Please provide a brief discussion regarding how the LEFM CheckPlus™ will be incorporated into the LGS preventive maintenance program.
- (2) RIS 2002-03, Attachment I, Section I, Item F asks that licensees provide information related to calibration and maintenance procedures that affect the power calorimetric calculation. Please provide a brief discussion related to how LGS will control the hardware and software configuration of the Cameron LEFM CheckPlus™ equipment.
- (3) A 72-hour Allowable Outage Time (AOT) has been requested for LGS, Units 1 and 2, to remain above the Current Licensed Thermal Power (i.e., 3458 MWt) up to the requested uprated power (i.e., 3515 MWt) in the event that the Cameron LEFM CheckPlus™ is declared non-operational. In support of this request, please provide information on the following:
 - a. Please provide a description of what level of degradation or system alert would render the Cameron LEFM CheckPlus™ to be declared non-operational at LGS, Units 1 and 2?

- b. If the power level is below the Current Licensed Thermal Power at the time the Cameron LEFM CheckPlus™ is declared non-operational or if the power level drops below the Current Licensed Thermal Power during the AOT, will power be raised above the Current Licensed Thermal Power prior to the Cameron LEFM CheckPlus™ becoming operational? If so, please provide justification? If not, please identify how these scenarios would be operationally controlled.
- c. Has there been any recent evidence of feedwater nozzle fouling at either LGS unit?
- d. Are there plant-specific feedwater flow nozzle measurement drift data for the LGS units? If so, is this data consistent with the measurement drift errors cited from Caldon Topical Report ER-80P, "Improving Thermal Power Accuracy and Plant Safety While Increasing Operating Power Level Using the LEFM $\sqrt{\text{TM}}$ System," Rev. 0, dated March 1997¹?
- (4) The LAR, Attachment 1, Section 3.4.4 states that the LGS setpoint methodology, as documented in CC-MA-103-2001 is "consistent" with NEDC-31336P-A, "General Electric Instrument Setpoint Methodology," dated September 1996². Has CC-MA-103-2001 been previously reviewed by the NRC? If so, please provide a reference for that review. If not, please summarize the technical differences and deviations (if any) between CC-MA-103-2001 and NEDC-31336P-A.
- (5) In LAR Attachment 11 (LE-0113, Rev 0), Section 8.0, page 64 - containing the Reactor Core Thermal Power Uncertainty Calculation – the statement is made that "the Core Thermal Power (CTP) uncertainty of 0.347% allows the original 2% margin to be reduced to 1.653% (2% - 0.347% = 1.653%), which is conservatively rounded down to 1.65%." The statement is repeated in LAR Attachment 1, Section 3.1, page 6. This statement is not entirely accurate and may be misleading to future users of LE-0113. The percentages in this calculation cannot be added to reconstitute the original 2% uncertainty, because the new 0.347% uncertainty is applied to the new uprated power value, not the current licensed thermal power. To be more specific, $100\% * 1.01653 * 1.00347 = 102.006\%$. The requested uprate (i.e., 3458 MWt to 3515 MWt) is a 1.648% increase (i.e., approximately 1.65% as stated in the LAR). Please correct LE-0113 to eliminate the statement that 1.653% would be an acceptable increase for the uprated power limit. Additionally, applying the 0.347% thermal power uncertainty to the proposed 3515 MWt licensed power level results in a maximum possible power level of 3527.197 MWt. This exceeds 102% of the current licensed thermal power level ($3458 * 1.02 = 3527.16$ MWt) by a small amount. Please confirm that the new maximum possible power level, with uncertainties included, would remain bounded by the plant safety analyses.

¹ A non-proprietary version of Caldon Topical Report ER-80P, designated as Caldon Topical Report ER-80, with the same title, can be found at ADAMS Accession No. 9703120207.

² A non-proprietary version of General Electric Topical Report NEDC-31336P-A, designated as General Electrical Topical Report NEDO-31336-A, with the same title, can be found at ADAMS Accession No. ML073450560.

- (6) In LAR Attachment 1, Section 3.2.3 points to Attachment 11 for the thermal power uncertainty calculation. However, Attachment 11 (LE-0113, Rev 0) only identifies itself as applicable to Unit 1. Given the equivalent mass flow rate uncertainties provided for both units, are there any plant-specific features of Unit 2 that would result in a different total thermal power uncertainty calculation? Is it intended that the calculation in Attachment 11 be applicable to both Limerick units?