UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

July 15, 2010

Mr. Michael J. Pacilio
President and Chief Nuclear Officer
Exelon Nuclear
4300 Winfield Road
Warrenville, IL 60555

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

Dear Mr. Pacilio:

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 Nuclear Regulatory Commission staff has been reviewing the response and has determined that additional information is needed to complete its review. The specific questions are found in the enclosed request for additional information (RAI). The questions were sent via electronic transmission on June 30, 2010, to Mr. Kevin Borton, of your staff. The draft questions were sent to ensure that the questions were understandable, the regulatory basis for the questions was clear, and to determine if the information was previously docketed. The draft questions were discussed in teleconference with your staff on July 2, 2010, and July 14, 2010. It was agreed that a response to this RAI would be submitted by August 16, 2010. If a response is not received by that date, the request will be subject to denial, pursuant to Title 10 of the *Code of Federal Regulations*, Section 2.108, "Denial of application for failure to supply information."

Please contact me at 301-415-2833, if you have any questions.

Sincerely,

Peter Bamford

Peter Bamford, Project Manager
Plant Licensing Branch I-2
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

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 (MUR)

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, the licensee) submitted a license amendment request (LAR) proposing to revise the operating license and technical specifications (TSs) 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 application also proposes a modification to the standby liquid control system (SLCS). The Nuclear Regulatory Commission (NRC) staff has been reviewing the submittal and has determined that additional information is needed to complete its review.

1. The LAR, Attachment 6, Section 3.2.1, "Fracture Toughness," requires additional information. Appendix G to Title 10 of the *Code of Federal Regulations* (10 CFR), Part 50, "Fracture Toughness Requirements," states that reactor vessel (RV) beltline materials must maintain upper-shelf energy (USE) throughout the life of the RV of no less than 50 foot-pounds (ft-lbs) unless it is demonstrated in a manner approved by the Director, Office of Nuclear Reactor Regulation, that lower values of Charpy USE will provide margins of safety against fracture equivalent to those required by Appendix G of Section XI of the American Society of Mechanical Engineers (ASME) Code. The submittal states that the minimum USE for LGS, Unit 1 is 24 ft-lbs at 32 effective full-power years (EFPY) for low-pressure coolant injection (LPCI) nozzle forging Q2Q35W, and is 25 ft-lbs for LGS, Unit 2 at 32 EFPY for LPCI nozzle forging Q2Q33W, and therefore "Equivalent Margin Analyses (EMAs) were performed for the limiting RV beltline plate, weld and nozzle forging materials." The licensee states that NEDO-32205-A, Rev. 1, "10 CFR 50 Appendix G Equivalent Margin Analysis for Low Upper Shelf Energy in [Boiling Water Reactor] BWR/2 through BWR/6 Vessels," was used with a bounding peak fluence of 1.9×10^{18} n/cm^2 [neutrons per square centimeter] to evaluate the vessel against the requirements of 10 CFR Part 50, Appendix G. In NEDO-32205-A, Rev. 1, the materials addressed in the analysis included: SA302 Grade B and Grade B Modified low allow steel plate, SA533 Grade B Class 1 low alloy steel plate, Shielded Metal Arc Welds, Electroslag Welds, Submerged Arc Welds (SAW) made with non-Linde 80 flux, and SAW with Linde 80 flux. The nozzle materials were not included in the NEDO-32205-A, Rev. 1 analysis. Therefore, the staff does not find the application of NEDO-32205-A, Rev. 1 acceptable for demonstrating compliance with Appendix G to 10 CFR Part 50 for LGS, Units 1 and 2 nozzle materials. The methodology contained in NEDO-32205-A, Rev. 1, is

applicable only to the materials analyzed in the report. For all RV beltline materials with USE values below 50 ft-lbs at 32 EFPY, the licensee must submit analyses to demonstrate that the lower values of Charpy USE will provide margins of safety against fracture equivalent to those required by Appendix G of Section XI of the ASME Code.

2. The current thermal licensed power (CTLP) pressure-temperature (P-T) curves, contained in "Pressure-Temperature Curves for [Philadelphia Electric Company] PECO Energy Company Limerick 1 (GE-NE-B11-00836-00-01, Rev. 0)," and "Pressure-Temperature Curves for PECO Energy Company Limerick 2 (GE-NE-B11-00836-00-02, Rev. 0)," did not include analysis of the water level instrumentation nozzles within the RV beltline region. Provide a technical basis to support the statement in Attachment 6, Section 3.2.1, "Fracture Toughness," that the water level instrumentation nozzle that occurs within the RV beltline region is bounded by the CTLP P-T curves.

3. Initial property values for RV beltline materials are not consistent with the values previously submitted in response to Generic Letter 92-01, Rev. 1, "Reactor Vessel Structural Integrity," and P-T curve submittals for LGS, Units 1 and 2 in GE-NE-B11-00836-00-01 and GE-NE-B11-00836-00-02, respectively. Provide a comprehensive listing of the RV beltline materials, including the heat number for each RV beltline plate or forging and the heat number of wire and flux lot number used to fabricate each RV beltline weld; the chemical composition, in particular the weight in percent of copper and nickel for each RV beltline material; and the unirradiated reference temperature for each RV beltline material, and the method of determining the unirradiated reference temperature from the Charpy and drop weight tests.

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/ra/
Peter Bamford, Project Manager
Plant Licensing Branch I-2
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Docket Nos. 50-352 and 50-353
Enclosure: As stated
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ADAMS Accession Number: ML101940053 * concurrence via email ** concurrence via memo

OFFICE	LPLI-2/PM	LPLI-2/LA	CVIB/BC	LPL1-2/BC
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