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

August 19, 2009

Mr. Charles G. Pardee
President and Chief Nuclear Officer
Exelon Nuclear
4300 Winfield Road
Warrenville, IL 60555

SUBJECT: LASALLE COUNTY STATION, UNITS 1 AND 2 – WITHDRAWAL OF LICENSE AMENDMENT REQUEST TO ALLOW GANGED ROD DRIVE CAPABILITY OF THE ROD CONTROL MANAGEMENT SYSTEM (TAC NOS. MD6642 AND MD6643)

Dear Mr. Pardee:

By letter to the Nuclear Regulatory Commission (NRC) dated August 14, 2007 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML072360042), Exelon Generation Company, LLC (EGC) submitted a request for license amendment (LAR) to allow ganged rod drive capability of the rod control management system (RCMS), for the LaSalle County Station (LSCS), Units 1 and 2. Based on the review of your submittal, the NRC staff determined that additional information was needed to complete its review. During the course of the review, the NRC staff provided five rounds of requests for additional information (RAIs) to EGC. EGC submitted supplemental information on May 13, 2008 (ADAMS Accession No. ML081340270), September 2, 2008 (ADAMS Accession No. ML082480173), October 10, 2008 and January 14, 2009 (not publically available), February 11, 2009 (ADAMS Accession No. ML090430594), and March 5, 2009 (ADAMS Accession No. ML090680523).

In addition to the RAIs, the NRC staff requested an audit to verify the supplemental information that EGC had provided. Exelon addressed open items identified during the audit by submitting revised updated final safety analysis report (UFSAR) supplements and additional analyses. An audit summary report was provided to EGC on January 29, 2009 (not publically available).

The submitted analyses of February 11, 2009, assumed that the RCMS would maintain its rod sequence control capabilities under software common cause failure (SWCCF) conditions. The outcome of the audit determined that this was not a valid assumption, and that the most reactive combinations of four-rod withdrawals must be analyzed. This means that the results of the submitted UFSAR supplement is non-conservative, in that it "under-predicts" the results of the transient that could occur under the credible, worst-case postulated failure of the RCMS. In this case, multiple, worst-case failures attributable to SWCCF could result in failure modes such as the following:

- Lack of, or improperly enforced, control rod withdrawal sequence control;
- Lack of, or improperly enforced, control rod withdrawal interlocks; and
- Spurious and simultaneous withdrawal of up to four control rods in various modes of operation.

These potential failure modes affect the LSCS licensing basis insofar as the reactivity control system, which is currently a combination of the Reactor Manual Control System, the Rod Drive Control System, the Rod Worth Minimizer and the Rod Position and Indication System, is credited in the licensing basis accident and transient analyses contained in Chapter 15, "Accident Analysis," of the LSCS UFSAR.

The newly installed RCMS encompasses, or enforces the functionality of, all aspects of the reactivity control systems at LSCS. Therefore, SWCCF is a malfunction of a different type than previously considered for the reactivity control system in the LSCS current licensing basis. Hence, the potential for SWCCF must be considered in each UFSAR-evaluated accident or transient that credits reactivity control for sequence termination or consequence mitigation.

The NRC staff has reviewed Exelon's February 11, 2009, and March 5, 2009, docketed evaluations of UFSAR Sections 15.4.1, "Rod Withdrawal Error –Low Power," and 15.4.2, "Rod Withdrawal Error – At Power," and has concluded that Exelon's disposition of SWCCF, as discussed above, does not provide an adequate basis for the analytic technique used to evaluate these new transients. In particular, the postulated transients Exelon evaluated assumed control rods could only be withdrawn in error from pre-defined gangs of extrinsically designed, low reactivity worth; the NRC staff's review has determined that SWCCF could impair the ability of the RCMS to enforce rod gang definitions, which would be non-conservative. Further, NRC staff has determined that Exelon did not consider the spurious and simultaneous withdrawal of the four highest worth control rods that could result from a SWCCF of the RCMS.

Additionally, the methodology used to analyze these postulated transients arising from a new or different malfunction of the RCMS has not been previously reviewed and approved by the NRC. While the CASMO4/MICROBURN-B2 (Siemens Power Corporation Methodology for Boiling-Water Reactors (BWR): Evaluation and Validation) code system has been reviewed and approved for BWR analysis of cores containing AREVA fuel designs, the methodology that implements the code system is approved for the steady-state analysis of a single control rod withdrawal error. The extension of this method to analyze a four-rod withdrawal error, which could insert greater amounts of positive reactivity at faster rates, was not entirely justified.

Furthermore, the RAMONA5-FA ("Computer Program for BWR Transient Analysis in the Time Domain") code system is not NRC-approved for the intended purpose of analyzing transient reactivity and power distribution anomalies. Exelon's justifying comparison, relating fuel rod enthalpy to the critical power response predicted by another analytic code system, does not provide an adequate validation of the RAMONA5-FA code system's predictive capabilities. While Exelon's RAMONA5-FA analyses relied on some clearly conservative initial condition assumptions and made comparisons to bounding evaluations of critical power response, RAMONA5-FA's predictive capability with respect to fuel rod enthalpy has been demonstrated to the NRC through neither an adequate, parametric code-to-code comparison, nor a benchmark to relevant experimental data.

At this time, the NRC staff cannot conclude that the requirements of General Design Criteria (GDC) 10, "Reactor Design," GDC 20, "Protection System Functions," and GDC 25, "Protection System Requirements for Reactivity Control Malfunctions," have been met by your analyses. The NRC staff is not assured that the licensee considered the most extreme operating conditions that would result from a SWCCF causing erroneous withdrawal of four, high reactivity worth control rods. Therefore, the NRC staff is not assured that the licensee's analyses consider the

maximum anticipated operational occurrence for single error control rod malfunctions, that the analytical methods and input data are reasonably conservative, and that specified acceptable fuel design limits will not be exceeded for the ganged control rod withdrawal error events at both low power and at-power conditions.

After reviewing the amendment request and the supplemental information EGC provided in the RAI responses, the NRC staff concluded the following:

- The LAR did not contain sufficient information or applicable bases; and
- The LAR was absent adequate data to justify the request;
- Non-conservative assumptions were presented in the request;
- The LAR did not evaluate the effects of common-cause failure; and
- No coping analysis was provided with the LAR

As a result of the above, the NRC staff concluded that there was not reasonable assurance in maintaining adequate protection of public health and safety and the environment if the requested LAR, with its current analyses, was implemented as requested.

Based on the issues described above, on July 16, 2009, the NRC contacted EGC notifying them of these issues with their application. Subsequently, by letter dated July 20, 2009 (ADAMS Accession No. ML092010462), EGC withdrew the amendment request to allow ganged rod drive capability of the RCMS.

The NRC staff is providing this withdrawal acknowledgement letter, and the above information to EGC, to assist with understanding the NRC staff's position regarding the unacceptability of the proposed licensing basis change with regard to the proposed RCMS LAR.

If you should have any questions regarding this letter, please contact me at (301) 415-3719.

Sincerely,

Cameron S. Goodwin, Project Manager
Plant Licensing Branch III-2
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket Nos. 50-373 and 50-374

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If you should have any questions regarding this letter, please contact me at (301) 415-3154.

Sincerely,
/RA/
Cameron S. Goodwin, Project Manager
Plant Licensing Branch III-2
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

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