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

September 16, 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, ISSUANCE OF AMENDMENTS RE: REQUEST FOR LICENSE AMENDMENT TO REVISE LOCAL POWER RANGE MONITOR CALIBRATION FREQUENCY (TAC NOS. MD9414 AND MD9415)

Dear Mr. Pardee:

The U.S. Nuclear Regulatory Commission (the Commission) has issued the enclosed Amendment No. 195 to Facility Operating License No. NPF-11 and Amendment No. 182 to Facility Operating License No. NPF-18 for the LaSalle County Station, Units 1 and 2, respectively. The amendments are in response to your application dated July 25, 2008 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML082110187), as supplemented by letters dated October 31, 2008 (ADAMS Accession No. ML083080059), February 17, 2009 (ADAMS Accession No. ML090480372), May 8, 2009 (ADAMS Accession No. ML092380433) and July 27, 2009 (ADAMS Accession No. ML092100162).

The amendments revise Technical Specification (TS) 3.3.1.1, "Reactor Protection System (RPS) Instrumentation," Surveillance Requirement (SR) 3.3.1.1.8 and TS 3.3.1.3, "Oscillation Power Range Monitor (OPRM) Instrumentation," SR 3.3.1.3.2 to increase the frequency interval between Local Power Range Monitor calibrations from 1000 effective full power hours (EFPH) to 2000 EFPH.

A copy of the Safety Evaluation is also enclosed. The Notice of Issuance will be included in the Commission's biweekly *Federal Register* notice.

Sincerely,

Cameron S. Goodwin

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

Enclosures:
1. Amendment No. 195 to NPF-11
2. Amendment No. 182 to NPF-18
3. Safety Evaluation

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

EXELON GENERATION COMPANY, LLC

DOCKET NO. 50-373

LASALLE COUNTY STATION, UNIT 1

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 195
License No. NPF-11

1. The U.S. Nuclear Regulatory Commission (the Commission) has found that:

   A. The application for amendment filed by the Exelon Generation Company, LLC (the licensee), dated July 25, 2008, as supplemented by letters dated October 31, 2008, February 17, May 8, and July 27, 2009, complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act), and the Commission's regulations set forth in 10 CFR Chapter I;

   B. The facility will operate in conformity with the application, the provisions of the Act, and the regulations of the Commission;

   C. There is reasonable assurance (i) that the activities authorized by this amendment can be conducted without endangering the health and safety of the public, and (ii) that such activities will be conducted in compliance with the Commission's regulations set forth in 10 CFR Chapter I;

   D. The issuance of this amendment will not be inimical to the common defense and security or to the health and safety of the public; and

   E. The issuance of this amendment is in accordance with 10 CFR Part 51 of the Commission's regulations and all applicable requirements have been satisfied.

2. Accordingly, the license is amended by changes to the Technical Specifications as indicated in the attachment to this license amendment and paragraph 2.C.(2) of the Facility Operating License No. NPF-11 is hereby amended to read as follows:

(2) Technical Specifications and Environmental Protection Plan

The Technical Specifications contained in Appendix A, as revised through Amendment No. 195 , and the Environmental Protection Plan contained in Appendix B, are hereby incorporated in the license. The licensee shall operate the facility in accordance with the Technical Specifications and the Environmental Protection Plan.

3. This license amendment is effective as of the date of its issuance and shall be implemented within 60 days of the date of issuance.

FOR THE NUCLEAR REGULATORY COMMISSION

Stephen J. Campbell

Stephen J. Campbell, Chief
Plant Licensing Branch III-2
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Attachment: Changes to the Technical Specifications and Facility Operating License

Date of Issuance: September 16, 2009

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

EXELON GENERATION COMPANY, LLC

DOCKET NO. 50-374

LASALLE COUNTY STATION, UNIT 2

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 182
License No. NPF-18

1. The U.S. Nuclear Regulatory Commission (the Commission) has found that:

   A. The application for amendment filed by the Exelon Generation Company, LLC (the licensee), dated July 25, 2008, as supplemented by letters dated October 31, 2008, February 17, May 8, and July 27, 2009, complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act), and the Commission's regulations set forth in 10 CFR Chapter I;

   B. The facility will operate in conformity with the application, the provisions of the Act, and the regulations of the Commission;

   C. There is reasonable assurance (i) that the activities authorized by this amendment can be conducted without endangering the health and safety of the public, and (ii) that such activities will be conducted in compliance with the Commission's regulations set forth in 10 CFR Chapter I;

   D. The issuance of this amendment will not be inimical to the common defense and security or to the health and safety of the public; and

   E. The issuance of this amendment is in accordance with 10 CFR Part 51 of the Commission's regulations and all applicable requirements have been satisfied.

2. Accordingly, the license is amended by changes to the Technical Specifications as indicated in the enclosure to this license amendment and paragraph 2.C.(2) of the Facility Operating License No. NPF-18 is hereby amended to read as follows:

(2) <u>Technical Specifications and Environmental Protection Plan</u>

The Technical Specifications contained in Appendix A, as revised through Amendment No. 182 , and the Environmental Protection Plan contained in Appendix B, are hereby incorporated in the license. The licensee shall operate the facility in accordance with the Technical Specifications and the Environmental Protection Plan.

3. This license amendment is effective as of the date of its issuance and shall be implemented within 60 days of the date of issuance.

FOR THE NUCLEAR REGULATORY COMMISSION

Stephen J. Campbell

Stephen J. Campbell, Chief
Plant Licensing Branch III-2
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Attachment: Changes to the Technical Specifications and Facility Operating License

Date of Issuance: September 16, 2009

ATTACHMENT TO LICENSE AMENDMENT NOS. 195 AND 182

FACILITY OPERATING LICENSE NOS. NPF-11 AND NPF-18

DOCKET NOS. 50-373 AND 50-374

Replace the following pages of the Facility Operating Licenses and Appendix "A" Technical Specifications with the enclosed pages. The revised pages are identified by amendment number and contain marginal lines indicating the areas of change.

Remove	Insert
License NPF-11 Page 3	License NPF-11 Page 3
License NPF-18 Page 3	License NPF-18 Page 3
TSs 3.3.1.1-4 3.3.1.3-3	TSs 3.3.1.1-4 3.3.1.3-3

Am. 146
01/12/01

(4) Exelon Generation Company, LLC, pursuant to the Act and 10 CFR Parts 30, 40, and 70, to receive, possess, and use in amounts as required any byproduct, source or special nuclear material without restriction to chemical or physical form, for sample analysis or instrument calibration or associated with radioactive apparatus or components; and

Am. 146
01/12/01

(5) Exelon Generation Company, LLC, pursuant to the Act and 10 CFR Parts 30, 40, and 70, to possess, but not separate, such byproduct and special nuclear materials as may be produced by the operation of LaSalle County Station, Units 1 and 2.

C. This license shall be deemed to contain and is subject to the conditions specified in the Commission's regulations set forth in 10 CFR Chapter I and is subject to all applicable provisions of the Act and to the rules, regulations, and orders of the Commission now or hereafter in effect; and is subject to the additional conditions specified or incorporated below:

(1) Maximum Power Level

The licensee is authorized to operate the facility at reactor core power levels not in excess of full power (3489 megawatts thermal).

(2) Technical Specifications and Environmental Protection Plan

The Technical Specifications contained in Appendix A, as revised through Amendment No. 195, and the Environmental Protection Plan contained in Appendix B, are hereby incorporated in the license. The licensee shall operate the facility in accordance with the Technical Specifications and the Environmental Protection Plan.

Am. 194
08/28/09

(3) DELETED

Am. 194
08/28/09

(4) DELETED

Am. 194
08/28/09

(5) DELETED

Am. 194
08/28/09

(6) DELETED

Am. 194
08/28/09

(7) DELETED

Am. 34
12/08/87

(5) Pursuant to the Act and 10 CFR Parts 30, 40, and 70, to possess, but not separate, such byproduct and special nuclear materials as may be produced by the operation of LaSalle County Station, Units 1 and 2.

C. The license shall be deemed to contain and is subject to the conditions specified in the Commission's regulations set forth in 10 CFR Chapter I and is subject to all applicable provisions of the Act and to the rules, regulations, and orders of the Commission now or hereafter in effect; and is subject to the additional conditions specified or incorporated below:

Am. 125
05/09/00

(1) Maximum Power Level

The licensee is authorized to operate the facility at reactor core power levels not in excess of full power (3489 megawatts thermal). Items in Attachment 1 shall be completed as specified. Attachment 1 is hereby incorporated into this license.

(2) Technical Specifications and Environmental Protection Plan

The Technical Specifications contained in Appendix A, as revised through Amendment No.182, and the Environmental Protection Plan contained in Appendix B, are hereby incorporated in the license. The licensee shall operate the facility in accordance with the Technical Specifications and the Environmental Protection Plan.

Am. 181
08/28/09

(3) DELETED

Am. 181
08/28/09

(4) DELETED

Am. 181
08/28/09

(5) DELETED

Am. 181
08/28/09

(6) DELETED

Am. 181
08/28/09

(7) DELETED

Am. 181
08/28/09

(8) DELETED

Am. 181
08/28/09

(9) DELETED

SURVEILLANCE REQUIREMENTS

SURVEILLANCE	FREQUENCY
SR 3.3.1.1.5 Perform CHANNEL FUNCTIONAL TEST.	7 days
SR 3.3.1.1.6 Verify the source range monitor (SRM and intermediate range monitor (IRM) channels overlap.	Prior to fully withdrawing SRMS
SR 3.3.1.1.7 ----------NOTE---------- Only required to be met during entry into MODE 2 from MODE 1. ------------------------------ Verify the IRM and APRM channels overlap.	7 days
SR 3.3.1.1.8 Calibrate the local power range monitors.	2000 effective full power hours
SR 3.3.1.1.9 Perform CHANNEL FUNCTIONAL TEST.	92 days
SR 3.3.1.1.10 Perform CHANNEL CALIBRATION.	92 days

(continued)

SURVEILLANCE REQUIREMENTS

-----NOTE-----
When a channel is placed in an inoperable status solely for performance of required Surveillances, entry into associated Conditions and Required Actions may be delayed for up to 6 hours provided the OPRM maintains trip capability.

SURVEILLANCE		FREQUENCY
SR 3.3.1.3.1	Perform CHANNEL FUNCTIONAL TEST.	184 days
SR 3.3.1.3.2	Calibrate the local power range monitors.	2000 effective full power hours
SR 3.3.1.3.3	-----NOTE----- Neutron detectors are excluded. ----- Perform CHANNEL CALIBRATION. The setpoints for the trip function shall be as specified in the COLR.	24 months
SR 3.3.1.3.4	Perform LOGIC SYSTEM FUNCTIONAL TEST.	24 months
SR 3.3.1.3.5	Verify OPRM is not bypassed when THERMAL POWER is ≥ 28.6% RTP and recirculation drive flow is ≤ 60% of rated recirculation drive flow.	24 months
SR 3.3.1.3.6	-----NOTE----- Neutron detectors are excluded. ----- Verify the RPS RESPONSE TIME is within limits.	24 months on a STAGGERED TEST BASIS

UNITED STATES
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WASHINGTON, D.C. 20555-0001

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO AMENDMENT NO. 195 TO FACILITY OPERATING LICENSE NO. NPF-11

AND AMENDMENT NO. 182 TO FACILITY OPERATING LICENSE NO. NPF-18

EXELON GENERATION COMPANY, LLC

LASALLE COUNTY STATION, UNITS 1 AND 2

DOCKET NOS. 50-373 AND 50-374

1.0 INTRODUCTION

By letter to the Nuclear Regulatory Commission (NRC, the Commission) dated July 25, 2008 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML082110187), as supplemented by letters dated October 31, 2008 (ADAMS Accession No. ML083080059), February 17, 2009 (ADAMS Accession No. ML090480372), May 8, 2009 (ADAMS Accession No. ML092380433) and July 27, 2009 (ADAMS Accession No. ML092100162), Exelon Generation Company, LLC (the licensee), requested changes to the technical specifications (TSs) and surveillance requirements (SRs) for LaSalle County Station (LSCS), Units 1 and 2. The proposed changes would revise TS 3.3.1.1, "Reactor Protection System (RPS) Instrumentation," SR 3.3.1.1.8 and TS 3.3.1.3, "Oscillation Power Range Monitor (OPRM) Instrumentation," SR 3.3.1.3.2 to increase the frequency interval between Local Power Range Monitor (LPRM) calibrations from 1000 effective full power hours (EFPH) to 2000 EFPH.

The October 31, 2008, February 17, 2009, May 8, 2009 and July 27, 2009 supplements, contained clarifying information and did not expand the scope of the original *Federal Register* (FR) notice and change the NRC staff's initial proposed finding of no significant hazards consideration.

2.0 REGULATORY EVALUATION

The staff used the following regulatory bases for its evaluation of the licensee's amendment request:

In Title 10 of the *Code of Federal Regulations* (10 CFR) 50.55a(h), the NRC endorses Institute of Electrical and Electronics Engineers (IEEE) Standard IEEE 603-1991, "IEEE Standard Criteria for Safety Systems for Nuclear Power Generating Stations," which addresses both system-level design issues and quality criteria for qualifying devices.

The regulation at 10 CFR 50.62, "Requirements for Reduction of Risk from Anticipated Transients without Scram (ATWS) Events for Light-Water Cooled Nuclear Power Plants," requires, in part, various diverse methods of responding to ATWS.

General Design Criterion (GDC) 21, "Protection System Reliability and Testability," of Appendix A, "General Design Criteria for Nuclear Power Plants," to 10 CFR Part 50, "Domestic Licensing of Production and Utilization Facilities," requires in part that the protection system be designed for high functional reliability and inservice testability commensurate with the safety functions to be performed.

In 10 CFR Section 50.36, "Technical specifications," the NRC establishes its regulatory requirements related to the content of TS. In accordance with the 10 CFR 50.36 requirements, TSs are required to include items in the following five specific categories related to station operation: (1) safety limits, limiting safety system settings, and limiting control settings; (2) limiting conditions for operation (LCOs); (3) SRs; (4) design features; and (5) administrative controls. Paragraph 50.36(c)(2)(ii)(C), Criterion 3, specifies that a TS LCO must be established for a "structure, system, or component that is part of the primary success path and which functions or actuates to mitigate a design-basis accident or transient that either assumes the failure of or presents a challenge to the integrity of a fission product barrier." Paragraph 50.36(c)(3) specifies that SRs are "requirements related to test, calibration, or inspection to assure that the necessary quality of systems and components is maintained, that facility operation will be within safety limits, and that the limiting conditions for operation will be met." Following these two provisions of 10 CFR 50.36, the licensee established TS SR 3.3.1.1.8 and SR 3.3.1.3.2 to provide assurance that the LPRM calibration interval will support LPRM accuracy requirements for input to the Rod Block Monitor (RBM), Average Power range Monitors (APRM) and OPRM.

GDC 10, "Reactor Design," of Appendix A to 10 CFR Part 50 requires that the reactor core and associated coolant control, and protection systems be designed with appropriate margin to assure that specified acceptable fuel design limits (SAFDLs) are not exceeded during any condition of normal operation, including the effects of anticipated operating occurrences. In the application of boiling-water reactors, the safety limit minimum critical power ratio (SLMCPR) is established to assure compliance with SAFDLs. The SLMCPR is the core-wide critical power ratio at which 99.9 percent of the fuel rods would not be expected to experience boiling transition during normal conditions.

The core monitoring system (CMS) is used by the licensee to establish that the core is operating within the SLMCPR. Since the LPRM reading is provided to the CMS as input for determining the core-wide minimum critical power ratio, its uncertainty must be accounted for in the statistical determination of the SLMCPR. Extending the LPRM calibration surveillance interval will increase the LPRM signal uncertainty value used in the LSCS SLMCPR analysis. In this review, the NRC staff evaluates the effects that increased calibration intervals would have on the power evaluation uncertainties considered in the SLMCPR analysis to ensure that the LSCS would remain in compliance with the requirements of 10 CFR 50.36 and GDC 10.

3.0 TECHNICAL EVALUATION

The licensee requested changes to the LSCS TS SR 3.3.1.1.8 and SR 3.3.1.3.2 to increase the interval between the whole core LPRM calibrations from 1000 EFPH to 2000 EFPH. The proposed TS changes are based on the following reasons (Ref. 1):

(1) The current TS SR 3.3.1.1.8 and SR 3.3.1.3.2 interval of 1000 EFPH between required LPRM calibrations is based on operating experience with the previous POWERPLEX-II CMS at the LSCS and older design LPRM detectors. The LSCS currently uses an improved POWERPLEX-III CMS and newer design LPRM chambers that exhibit more consistent sensitivity behavior than the older LPRM detectors.

(2) An LSCS plant specific LPRM uncertainty analysis shows that the LPRM response uncertainty used in the current SLMCPR analysis remains bounding for the LSCS when the LPRM calibration is extended from 1000 EFPH to 2000 EFPH.

(3) The analysis also shows that the increase in the LPRM response uncertainty, when accounting for TS SR 3.0.2 that allows 25 percent extension of the calibration interval (i.e., 2500 EFPH), is bounded by the value used for current reload analysis and the currently approved SLMCPR power distribution uncertainties.

The NRC staff's review of the proposed TS changes (Ref. 1) and the licensee's response (Refs. 2 through 4, and 8) to the requests for additional information (RAIs) is discussed as follows.

3.1 Background

The LPRMs are part of the neutron monitoring system. At LSCS, the LPRM system includes 43 radially-distributed LPRM detector strings having detectors located at different axial heights in the core. Each detector string contains four fission chambers (a total of 172 detectors). The chambers are vertically spaced in the LPRM detector assembly. Each fission chamber produces a current that is coupled with the LPRM signal-conditioning equipment to provide the desired scale indications. LPRMs are calibrated periodically because of depletion of the fissile detection material in the fission chambers. Through a calibration process, instrument uncertainties in the measurement of core operating parameters may be minimized. Each LPRM assembly contains a calibration tube for a Traversing Incore Probe (TIP). The TIP system provides a signal proportional to the gamma flux, which correlates to the neutron flux at LPRM locations. This flux signal is collected by the plant computer system. The collected TIP data is compared to the LPRM reading and each gain adjustment factor (GAF) for LPRM is calculated. These GAF values are applied to LPRM signals during the calibration of all the fixed LPRM fission detectors. LPRM calibrations are performed while the reactor is operating at power due to the limited sensitivity of the LPRM detectors. The LPRM calibration is performed by executing the on-demand computer program that is used to collect axial neutron flux data and then LPRM output signal is adjusted if required, to match the TIP signal.

The LPRM system provides indication of neutron flux, which can be correlated to thermal power levels for the entire range of flux conditions that exist in the core. It provides output to the RBM, APRMs, OPRM system, the core monitoring system, and the plant process computer. Also, the recirculation system provides recirculation loop flows for flux bias scram and rod block settings. The RBM limits control rod withdrawal if localized neutron flux exceeds a predefined setpoint. The APRMs provide indication of the core average thermal power and input to the RPS that initiates a trip if trip setpoints are exceeded. The OPRM initiates a trip whenever it detects an instability condition. Input from the neutron monitor system to the process computer is used to calculate core thermal limits and ensure operations are within established limits.

The proposed increase in the interval between required LPRM calibrations is to lessen the impact on plant personnel workload and increase the operating flexibility.

3.2 Method Used for the LPRM Uncertainty Analysis

The licensee conducted LPRM uncertainty analyses using the LRPM calibration data collected during the period of 1996 through 2006 from GE Reuter-Stokes NA300 LPRM detectors that are currently installed in the LSCS (Refs. 1 and 2).

In the LPRM uncertainty analysis, the actual calibration data are used to establish a database of various calibration intervals. The actual calibration data include the core average exposure, accumulated LPRM exposure, and measured calibration current. With an actual data point as the initial condition, a predicted calibration current with a specified core average exposure interval is calculated through an exponential decay equation, which represents the predicted calibration current as a function of the previous calibration current, the LRPM exposure and the decay constant (Ref. 2). Predicted calibration currents are calculated for the actual calibration interval as well as for hypothetical calibration intervals by skipping one or more of the intermediate calibrations. Since the actual calibration current is independent of the previous calibration, a predicted calibration current for an extended calibration interval is simulated by generating the predicted current using the sum of the intermediate accumulated LPRM exposure values. Comparing the predicted current with the actual calibrated current for the exposure interval, the percentage of deviation is determined for the exposure interval. Since this method could skip the actual calibration point, more prediction points than actual calibration points are established in the LPRM uncertainty analysis.

The LPRM accumulated exposure values are collected (Ref. 2) from the CMS (i.e., POWERPLEX-II and POWERPLEX-III). For the data taken during the period of 1996 to 2004, MICROBURN-B, which was implemented in POWERPLEX-II, calculated (Ref. 4) the flux at the LPRM location and integrated this value over time in accordance with the NRC-approved topical report, XN-NF-80-19(A), Volume 1, Supplements 3 and 4 dated November 1990 (Ref. 5). From 2004 to 2006, MICROBURN-B2, which was implemented in POWERPLEX-III, calculated the LRPM accumulated exposure values in accordance with the NRC-approved topical report, EMF-2158(A), dated October 1999 (Ref. 6). The licensee indicates (Ref. 2) that the latest POWERPLEX-III in the CMS calculates a more accurate neutron flux than the POWERPLEX-II, and therefore, the latest data of exposure obtained for the LPRMs are more accurate but not significant enough to impact the results of the LPRM uncertainty analysis. The NRC staff finds that: (1) the use of an exponential decay equation for predicting the calibration current was previously approved by NRC for a BWR (Ref. 7) that requested a TS change for an extended LPRM calibration interval; and (2) the NRC approved methods (Ref. 5 and 6) are used to calculate the LPRM accumulated exposure values. Therefore, the NRC staff concludes that the methods used in the uncertainty analysis for supporting the extended LPRM calibration interval are acceptable.

3.3 Results of LPRM Uncertainty Analyses

Based on the methodologies and the LRPM calibration data discussed in Section 3.2 above, the licensee performed a LPRM uncertainty analysis and presented the calculated values of the relative standard deviations for 1000 EFPH and 2000 EFPH in Table A of Attachment 4 to

Reference 1. The licensee calculated the predicted calibration currents using an effective decay factor of -0.092 for the LRPM detectors and compared the predicted calibration currents with measured calibration currents to obtain relative standard deviations. The results show that the increase in LPRM response uncertainty (i.e., standard deviation) resulting from the calibration interval extended from 1000 EFPH to 2000 EFPH is not significant. The values in Table A applicable to LSCS Units 1 and 2, are less than the value used for the LPRM signal uncertainty in the current SLMCPR analysis.

3.4 Analysis for TS SR 3.0.2 That Allows 25 Percent Extension of the Calibration Interval

The licensee provides in Attachment 5 to Reference 1 the results of an additional analysis to support the increase in LPRM response uncertainty when accounting for TS SR 3.0.2 that allows 25 percent extension of the calibration interval of 2000 EFPH to 2500 EFPH. The analysis shows that the equivalent LPRM response uncertainty for the increased calibration interval of 2500 EFPH would increase the LPRM response uncertainty, but the resultant value is less than the uncertainty limit currently used in calculating radial bundle power distribution for SLMCPR analysis. Thus, the radial bundle power uncertainty is maintained and the SLMCPR remains unchanged.

The exposures used to calculate the LPRM uncertainty as provided in Attachment 5 of Reference 1 are in the unit of megawatt-days/metric ton uranium (MWd/MTU). The calibration intervals use data that are ±500 MWd/MTU around the specified intervals of 1000 MWd/MTU, 2000 MWd/MTU, and 2500 MWd/MTU. For example, the LPRM uncertainty for the 2000 MWd/MTU calibration interval contains all data between 1500 MWd/MTU and 2500 MWd/MTU, and the LPRM uncertainty for the 2500 MWd/MTU calibration interval contains all data between 2000 MWd/MTU and 3000 MUW/MTU. The value of ±500 MWd/MTU for the data range is used to balance actual calibration data around the desired internal calibration and provide sufficient data for a meaningful standard deviation. The licensee indicates that the difference between exposure units of EFPH and MWd/MTU is small, and the conversion factor for the LSCS is approximately 1.07 (MWd/MTU)/ EFPH. Thus, the upper bound calibration interval of 2500 MWd/MTU used in Attachment 5 equals 2336 EFPH. When comparing the results of LPRM uncertainties shown in Attachment 4 with that in Attachment 5, the NRC staff noted that the difference between them increases as the exposure interval increases. Based on the above discussion, the NRC staff does not have confidence that if the analysis were performed for 2500 EFPH instead of 2336 EFPH, the increase of uncertainty would not have been significantly greater that the value indicated in Attachment 5. The NRC staff requested that the licensee provide additional information to support the adequacy of the upper bound calibration exposure of 2500 EFPH (Ref 2). In response, the licensee performed an additional analysis for 2500 EFPH (equivalent to 2675 MWd/MTU) instead of 2500 MWd/MTU. The results in Table 7 of Reference 2 show that the uncertainty increase resulting from the exposure increased from 1000 MWd/MTU to 2675 MWd/MTU is bounded by the value used in the SLMCPR analysis for the values of the fixed decay constants of -0.080, -0.092, and -0.100. For the case with the decay constant of -0.1189, the increased calibration uncertainty exceeds the value used in the SLMCPR calculations. As part of implementation actions, the decay constant used in POWERPLEX-III input deck will be adjusted to -0.100 for a nominal 2000 EFPH extended calibration interval to limit the LPRM uncertainty within the acceptable Table 7 (Ref. 2) values for the decay constant of -0.100.

Since each LPRM detector has its specific decay constant, the NRC staff had a concern that the results of the uncertainty analysis using fixed decay constants of -0.080, -0.092, and -0.100 may not adequately represent the actual data with values of the decay constants specific to various LPRM detectors. In response to the NRC staff's concern, the licensee performed an uncertainty analysis using the decay constants specific to the LPRM detectors and provided the results in Reference 8. Table 3 and 4 of Reference 8 show the calculated values of the LRPM specific decay constants for LSCS Units 1 and 2, respectively. The decay constant values are determined by performing a least square fit of the logarithm of the actual calibration currents as a function of detector exposure for each individual LPRM detector. Table 1 shows the relative standard deviations for Units 1 and 2 applicable to calibration intervals of 1000 MWd/MTU, 2500 MWd/MTU, and 2675 MWd/MTU. Since the calculated values of the relative standard deviations shown in Table 1 of Reference 8 are bounded by the values assumed for SLMCPR calculations, the NRC staff concludes that the uncertainty analysis using the LPRM specific decay constants is acceptable.

3.5 Effects of the Changes of the LRPM Surveillance Interval on RBM, APRM, and OPRM

The RBM system protects the core from excessive localized energy addition associated with an erroneous control withdrawal by blocking rod movement. In the response to RAI 6 of Reference 2, the licensee states that a reduced LPRM calibration frequency will not adversely affect the RBM function. It indicates that when a control rod is selected to move, the RBM will go through a sequence that adjusts the LPRM gains to match the APRM power. The LPRM outputs associated with the selected control rod are averaged and compared with the reference APRM signal. If the average LPRM signal is greater than or equal to the APRM reference signal, it will be used. If the average LPRM signal is less than the APRM reference signal, the gain circuitry will increase the gain until the average APRM signal is equal to or slightly greater than the reference signal. This new averaged LPRM signal is compared to the reactor recirculation total flow reference signal. A rod block will be generated if the averaged LPRM power exceeds the flow reference set point. Since the actual LPRM signal gain is appropriately adjusted to the reference APRM signal, the NRC staff concludes that a reduced LPRM calibration frequency would not adversely affect the RBM function.

The APRMs provide indication of the core average thermal power and input to the RPS. The licensee's RAI response (Ref. 2) indicates that the APRM signals are maintained within TS required accuracy limits by weekly comparison to heat balance calculations. Specifically, LSCS RS 3.3.1.1.2 requires a weekly verification that the absolute difference between the APRM signals and the reactor power is not more than 2 percent of rated thermal power (RTP) while operating at power levels greater than or equal to 25 percent RTP. Since the APRM signals are calibrated using a means other than the TIP system comparison for which the interval extension has been requested, the NRC staff concludes that the APRM signals would not be adversely affected by the requested extension.

The OPRM system monitors the core for thermal-hydraulic instabilities, which are indicated by cyclic fluctuations in neutronic power. In the response to RAI 6 of Reference 2, the licensee stated that the OPRM set point requires that oscillations be in frequency with that characterized by thermal-hydraulic oscillations of a period of 1.0 to 3.5 seconds and continue in this frequency for 14 counts. If the counts reach the set point, the amplitude is checked. A trip signal is generated if the amplitude has increased to 1.11 times the prior 5-second LPRM average power.

The next trip algorithm is the amplitude based and its set point is 1.3 times the prior 5-second LPRM average power. The last algorithm is the growth rate based trip, which has a growth rate factor set point that is 1.3 times the prior 5-second average LPRM power. Since the trip of the OPRM system are dependent on the relative change in LPRM average power and are not dependent on the specific LPRM gains, the NRC staff concludes that a reduced LPRM calibration frequency would not adversely affect the OPRM function.

3.6 Analysis of the Instrument and Controls (I&C) Aspect of the Request

The NRC staff reviewed the I&C aspect of the application and prepared an RAI asking the applicant to justify the following statements:

- The newer CMS and LPRM detectors provide more accurate power indications than the older CMS and LPRM detectors.
- The extension of the calibration period would not lower the probability of identifying LPRM detector errors.

In its response to the RAI on October 31, 2008, the licensee stated that all LPRM calibration data collected by LSCS for use in the LPRM uncertainty analysis come from General Electric NA300 LPRM detectors. LSCS no longer uses the previous NA200 LPRM detectors and therefore did not apply their data in any of the analyses. The LPRM detector exposures were obtained from several versions of the CMS. The licensee also stated that the latest POWERPLEX-III version calculates a more accurate neutron flux than POWERPLEX-II, and therefore, the exposures obtained for the LPRMs are more accurate but not significant enough to impact the results obtained by the analysis.

In response to the NRC staff's RAI asking whether the extension of the calibration period would lower the probability of identifying detector failure, the licensee stated that various methods are routinely used to identify LSCS LPRM failure. In addition to actual calibration, these methods include continuous CMS monitoring, a routine APRM check every 12 hours (SR 3.3.1.1.1), weekly APRM channel verification (SR 3.3.1.1.2), continuous monitoring of individual LPRM detectors by the plant process computer, and control room LPRM detector alarms (annunciators). Finally, the LPRM calibration presents an opportunity to detect LPRM errors when matching the LPRM gain adjustment factors to the values corresponding to the TIP traces. Therefore, a malfunctioning or erroneous LPRM will be identified by these methods.

The NRC staff finds that the licensee's response is acceptable, and it concludes that the extension of the calibration interval will not have an adverse impact on the ability to identify detector failure.

Therefore, the NRC staff concludes that the I&C aspect of the proposed change to the TS, as discussed, is acceptable.

3.7 Summary

On the basis of the above Section 3 discussion, the NRC determines that the proposed change to LSCS TS to increase the LPRM calibration interval from 1000 EFPH to 2000 EFPH is acceptable based on the following findings:

(1) the adequate plant specific LPRM calibration data and the NRC-approved methods are used for the LPRM uncertainty analysis;

(2) the results of the LPRM uncertainty analysis show that the calculated LSCS LPRM calibration uncertainties are bounded by the approved power distribution uncertainties used in the SLMCPR analysis;

(3) the proposed TS changes do not inadvertently affect the functions of the RBM, APRM, and OPRM; and

(4) the proposed TS changes do not affect any safety analysis methods, core thermal limits, or current safety analysis results.

4.0 STATE CONSULTATION

In accordance with the Commission's regulations, the Illinois State official was notified of the proposed issuance of the amendments. The State official had no comments.

5.0 ENVIRONMENTAL CONSIDERATION

The amendments change SRs 3.3.1.1.8 and 3.3.1.3.2. The NRC staff has determined that the amendments involve no significant increase in the amounts, and no significant change in the types, of any effluents that may be released offsite, and that there is no significant increase in individual or cumulative occupational radiation exposure. The Commission has previously issued a proposed finding that the amendments involve no significant hazards consideration, and there has been no public comment on such finding (74 FR 4250-4251; January 23, 2009). Accordingly, the amendments meet the eligibility criteria for categorical exclusion set forth in 10 CFR 51.22(c)(9). Pursuant to 10 CFR 51.22(b), no environmental impact statement or environmental assessment need be prepared in connection with the issuance of the amendments.

6.0 CONCLUSION

The Commission has concluded, based on the considerations discussed above, that: (1) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner, (2) such activities will be conducted in compliance with the Commission's regulations, and (3) the issuance of the amendments will not be inimical to the common defense and security or to the health and safety of the public.

7.0 REFERENCES

1. Letter from P. R. Simpson (EGC) to U.S. NRC, "Request for a License Amendment to Revise Local Power Range Monitor Calibration Frequency," dated July 25, 2008 (ADAMS Accession No. ML082110187).

2. Letter from P. R. Simpson (EGC) to U.S. NRC, "Additional Information Supporting the Request for a License Amendment to Revise Local Power Monitor Calibration Frequency," dated October 31, 2008 (ADAMS Accession No. ML083080059).

3. Letter from P. R. Simpson (EGC) to U.S. NRC, "Additional Information Supporting the Request for a License Amendment to Revise Local Power Monitor Calibration Frequency," dated February 17, 2009 (ADAMS Accession No. ML090480372).

4. Letter from P. R. Simpson (EGC) to U.S. NRC, "Additional Information Supporting the Request for a License Amendment to Revise Local Power Monitor Calibration Frequency," dated May 8, 2009 (ADAMS Accession No. ML092380433).

5. Advanced Nuclear Fuels Topical Report XN-NF-80-19(P)(A), Volume 1, Supplements 3 and 4, "Advanced Nuclear Fuels Corporation Methodology for Boling Water Reactors: benchmark results for CASMO-3G/MICROBURN-B calculation methodology," dated November 1990 (Non-public).

6. EMF-2158(P) (A), "Siemens Power Corporation Methodology for Boiling Water Reactors: Evaluation and Validation of CASMO-4/MICROBURN-B2," dated March 27, 2000 (ADAMS Accession No. ML003698460).

7. Letter from B. Vaidya (NRC) to W. Brian (EGC), "Grand Gulf Nuclear Station, Unit 1 – Issuance of Amendment Re: Changes to Technical Specifications Surveillance Requirement 3.3.1.1.7, the Local Power Range Monitor Calibration Frequency (TAC No. MD3469," dated October 24, 2007 (ADAMS Accession No. ML0724900060).

8. Letter from P. R. Simpson (EGC) to U.S. NRC, "Additional Information Supporting the Request for a License Amendment to Revise Local Power Monitor Calibration Frequency," dated July 27, 2009 (ADAMS Accession No. ML092100162).

Principal Contributors: S. Sun, NRR
P. Chung, NRR

Date: September 16, 2009

A copy of the Safety Evaluation is also enclosed. The Notice of Issuance will be included in the Commission's biweekly *Federal Register* notice.

Sincerely,

/RA/

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

Enclosures:
1. Amendment No. 195 to NPF-11
2. Amendment No. 182 to NPF-18
3. Safety Evaluation

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ADAMS Accession No. ML092440755 NRR-058 *By memo dated

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