

August 26, 2005

Mr. Christopher M. Crane
President and Chief Nuclear Officer
Exelon Nuclear
Exelon Generation Company, LLC
200 Exelon Way, KSA 3-E
Kennett Square, PA 19348

SUBJECT: LIMERICK GENERATING STATION, UNITS 1 AND 2 - ISSUANCE OF
AMENDMENT RE: ACTIVATION OF THE TRIP OUTPUTS OF THE
OSCILLATION POWER RANGE MONITOR PORTION OF THE POWER
RANGE NEUTRON MONITORING SYSTEM (TAC NOS. MC3430 AND
MC3431)

Dear Mr. Crane:

The Commission has issued the enclosed Amendment No. 177 to Facility Operating License No. NPF-39 and Amendment No. 139 to Facility Operating License No. NPF-85 for the Limerick Generating Station, Units 1 and 2. These amendments consist of changes to the Technical Specifications (TSs) in response to your application dated May 20, 2004, as supplemented by letters dated February 18 and July 13, 2005.

These amendments revise TS 2.2.1, "Reactor Protection System Instrumentation Setpoints"; TS 3/4.3.1, "Reactor Protection System Instrumentation"; TS 3/4.3.6, "Control Rod Block Instrumentation"; TS 3/4.4.1, "Recirculation System"; TS 6.9.1, "Routine Reports"; and the associated TS Bases.

A copy of our safety evaluation is also enclosed. Notice of Issuance will be included in the Commission's biweekly *Federal Register* notice.

Sincerely,

/RA/

Travis L. Tate, Project Manager, Section 2
Project Directorate I
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

Docket Nos. 50-352 and 50-353

Enclosures: 1. Amendment No. 177 to
License No. NPF-39
2. Amendment No. 139 to
License No. NPF-85
3. Safety Evaluation

cc w/encls: See next page

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Sincerely,

/RA/

Travis L. Tate, Project Manager, Section 2
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 Office of Nuclear Reactor Regulation

Docket Nos. 50-352 and 50-353

- Enclosures: 1. Amendment No. 177 to License No. NPF-39
 2. Amendment No. 139 to License No. NPF-85
 3. Safety Evaluation

cc w/encls: See next page

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PUBLIC	PDI-2 R/F	DRoberts	TTate	MO'Brien	MShanbaky, RI
OGC	ACRS	GHill (4)	TBoyce	HGarg	MRazzaque
AHowe	DLPM DPR	FAkstulewicz			

Accession Number: ML052270429

*SE input date. No major changes made.

OFFICE	PDI-2/PM	PDI-2/LA	EEIB/SC*	SRXB/SC*	IROB/SC	OGC	PDI-2/SC
NAME	TTate	MO'Brien	EMarinos	FAkstulewicz	TBoyce	MDuffy	SBailey for DRoberts
DATE	8/26/05	8/26/05	4/4/05	6/17/05	8/25/05	8/23/05	8/26/05

EXELON GENERATION COMPANY, LLC

DOCKET NO. 50-352

LIMERICK GENERATING STATION, UNIT 1

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 177
License No. NPF-39

1. The Nuclear Regulatory Commission (the Commission) has found that:
 - A. The application for amendment by Exelon Generation Company, LLC (the licensee) dated May 20, 2004, as supplemented February 18 and July 13, 2005, complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act), and the Commission's rules and 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 rules and 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;
 - 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 Facility Operating License No. NPF-39 is hereby amended to read as follows:

Technical Specifications

The Technical Specifications contained in Appendix A and the Environmental Protection Plan contained in Appendix B, as revised through Amendment No. 177, are hereby incorporated in the license. Exelon Generation Company shall operate the facility in accordance with the Technical Specifications and the Environmental Protection Plan.

3. This license amendment is effective as of its date of issuance and shall be implemented within 90 days.

FOR THE NUCLEAR REGULATORY COMMISSION

/RA by S Bailey for/

Darrell J. Roberts, Chief, Section 2
Project Directorate I
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

Attachment: Changes to the
Technical Specifications

Date of Issuance: August 26, 2005

ATTACHMENT TO LICENSE AMENDMENT NO. 177

FACILITY OPERATING LICENSE NO. NPF-39

DOCKET NO. 50-352

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

<u>Remove</u>	<u>Insert</u>
xi	xi
2-4	2-4
B 2-6	B 2-6
B 2-7	B 2-7
	B 2-7a
B 2-9	B 2-9
	B 2-10
3/4 3-1	3/4 3-1
3/4 3-1a	3/4 3-1a
3/4 3-2	3/4 3-2
3/4 3-4	3/4 3-4
3/4 3-5	3/4 3-5
3/4 3-6	3/4 3-6
3/4 3-7	3/4 3-7
3/4 3-8	3/4 3-8
3/4 3-58	3/4 3-58
3/4 3-60	3/4 3-60
3/4 3-60a	3/4 3-60a
3/4 3-61	3/4 3-61
3/4 4-1	3/4 4-1
3/4 4-1a	3/4 4-1a
3/4 4-2	3/4 4-2
3/4 4-3	3/4 4-3
B 3/4 3-1	B 3/4 3-1
B 3/4 3-1a	B 3/4 3-1a
B 3/4 3-1b	B 3/4 3-1b
B 3/4 3-1c	B 3/4 3-1c
	B 3/4 3-1d
	B 3/4 3-1e
B 3/4 3-7	B 3/4 3-7
B 3/4 4-1	B 3/4 4-1
B 3/4 4-2	B 3/4 4-2
6-18a	6-18a

EXELON GENERATION COMPANY, LLC

DOCKET NO. 50-353

LIMERICK GENERATING STATION, UNIT 2

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 139
License No. NPF-85

1. The Nuclear Regulatory Commission (the Commission) has found that:
 - A. The application for amendment by Exelon Generation Company, LLC (the licensee) dated May 20, 2004, as supplemented February 18 and July 13, 2005, complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act), and the Commission's rules and 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 rules and 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;
 - 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 Facility Operating License No. NPF-85 is hereby amended to read as follows:

Technical Specifications

The Technical Specifications contained in Appendix A and the Environmental Protection Plan contained in Appendix B, as revised through Amendment No. 139, are hereby incorporated in the license. Exelon Generation Company shall operate the facility in accordance with the Technical Specifications and the Environmental Protection Plan.

3. The license amendment is effective as of its date of issuance and shall be implemented within 90 days.

FOR THE NUCLEAR REGULATORY COMMISSION

/RA by S Bailey for/

Darrell J. Roberts, Chief, Section 2
Project Directorate I
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

Attachment: Changes to the
Technical Specifications

Date of Issuance: August 26, 2005

ATTACHMENT TO LICENSE AMENDMENT NO. 139

FACILITY OPERATING LICENSE NO. NPF-85

DOCKET NO. 50-353

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

<u>Remove</u>	<u>Insert</u>
xi	xi
2-4	2-4
B 2-6	B 2-6
B 2-7	B 2-7
	B 2-7a
B 2-9	B 2-9
	B 2-10
3/4 3-1	3/4 3-1
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3/4 3-2	3/4 3-2
3/4 3-4	3/4 3-4
3/4 3-5	3/4 3-5
3/4 3-6	3/4 3-6
3/4 3-7	3/4 3-7
3/4 3-8	3/4 3-8
3/4 3-58	3/4 3-58
3/4 3-60	3/4 3-60
3/4 3-60a	3/4 3-60a
3/4 3-61	3/4 3-61
3/4 4-1	3/4 4-1
3/4 4-1a	3/4 4-1a
3/4 4-2	3/4 4-2
3/4 4-3	3/4 4-3
B 3/4 3-1	B 3/4 3-1
B 3/4 3-1a	B 3/4 3-1a
B 3/4 3-1b	B 3/4 3-1b
B 3/4 3-1c	B 3/4 3-1c
	B 3/4 3-1d
	B 3/4 3-1e
B 3/4 3-7	B 3/4 3-7
B 3/4 4-1	B 3/4 4-1
B 3/4 4-2	B 3/4 4-2
6-18a	6-18a

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION
RELATED TO AMENDMENT NOS. 177 AND 139 TO FACILITY OPERATING
LICENSE NOS. NPF-39 AND NPF-85
EXELON GENERATION COMPANY, LLC
LIMERICK GENERATING STATION, UNITS 1 AND 2
DOCKET NOS. 50-352 AND 50-353

1.0 INTRODUCTION

By application dated May 20, 2004 [Agencywide Documents Access Management System (ADAMS), Accession Number ML041540457], as supplemented by letters dated February 18 and July 13, 2005 (ADAMS Accession Numbers ML050550300 and ML051940641, respectively), Exelon Generation Company, LLC (Exelon or the licensee), requested changes to the technical specifications (TSs) for Limerick Generating Station, Units 1 and 2 (LGS). The supplements dated February 18 and July 13, 2005, provided additional information that clarified the application, did not expand the scope of the application as originally noticed, and did not change the staff's original proposed no significant hazards consideration determination as published in the *Federal Register* on October 26, 2004 (69 FR 62474).

The proposed changes would revise the LGS TSs to support activation of the oscillation power range monitor (OPRM) portion of the power range neutron monitoring (PRNM) system. Specifically, the proposed change would revise TS 2.2.1, "Reactor Protection System Instrumentation Setpoints"; TS 3/4.3.1, "Reactor Protection System Instrumentation"; TS 3/4.3.6, "Control Rod Block Instrumentation"; TS 3/4.4.1, "Recirculation System"; TS 6.9.1, "Routine Reports"; and the associated TS Bases.

2.0 REGULATORY EVALUATION

Title 10 of the *Code of Federal Regulations* (10 CFR), Part 50, Appendix A, General Design Criteria (GDC) 10, "Reactor design," requires that the reactor core be designed with appropriate margin to assure that specified acceptable fuel design limits will not be exceeded during any condition of normal operation, including the effects of anticipated operational occurrences. GDC 12, "Suppression of reactor power oscillations," requires assurance that power oscillations which can result in conditions exceeding specified acceptable fuel design limits are either not possible or can be reliably and readily detected and suppressed.

On July 11, 1994, the U.S. Nuclear Regulatory Commission (NRC) issued Generic Letter (GL) 94-02, "Long-Term Solutions and Upgrade of Interim Operating Recommendations for Thermal-Hydraulic Instabilities in Boiling Water Reactors [BWR]." GL 94-02 requested BWR licensees,

to: (1) take the appropriate actions to augment its respective procedures and training for preventing or responding to thermal-hydraulic instabilities in its reactors, and (2) submit to the NRC a plan describing the long-term stability solution option it has selected and the implementation schedule it proposes for the modification of plant protection systems to ensure compliance with GDC 10 and 12.

In response to GL 94-02, the licensee proposed design modifications to the PRNM system at LGS. By letter dated October 14, 1999, as supplemented by letter dated February 11, 2000, the licensee proposed license amendments to revise the LGS TSs to support installation of the design modification. On April 12, 2000, and January 16, 2001, the NRC issued Amendment No. 141 to Facility Operating License No. NPF-39 and Amendment No. 109 to Facility Operating License No. NPF-85 for LGS Units 1 and 2, respectively. These amendments approved the TS changes to support the upgrade of the existing analog PRNM system with a General Electric (GE) Nuclear Measurement Analysis and Control (NUMAC) PRNM system. The NUMAC PRNM system also includes an OPRM to detect and suppress reactor power instabilities and provides an automatic trip function. The previously approved TS changes applied only to the PRNM portion of the modification affecting the reactor protection system (RPS) and the rod-block monitor (RBM) functions of the average power range monitor (APRM) instrumentation.

Supplement 1 to GE Licensing Topical Report (LTR), NEDC-32410P-A, "Nuclear Measurement Analysis and Control Power Range Neutron Monitor (NUMAC-PRNM) Retrofit Plus Option III Stability Trip Function," discusses the OPRM detect-and-suppress function to implement Option III for the NRC-approved GE NUMAC PRNM system. This LTR addresses the full scope of the modification to replace the PRNM portion of an analog neutron monitoring system in GE BWRs with a GE NUMAC-PRNM system including an OPRM. In addition, this LTR requires licensees to provide plant-specific responses of utility actions.

The OPRM is referred to as the Option III stability trip function in the staff-approved LTR NEDO-31960-A (including Supplement 1), "BWR Owner's Group [BWROG] Long-Term Stability Solutions Licensing Methodology." NEDO-32465-A, "Reactor Stability Detect and Suppress Solutions Licensing Basis Methodology for Reload Applications," provides the Option III licensing methodology for establishing the OPRM period-based detection algorithm (PBDA) upscale trip setpoints.

NUREG-1433, "Standard Technical Specifications [STS], General Electric Plants (BWR/4)," Revision 3, contains the improved STSs which were developed based on the criteria in the "Final Commission Policy Statement on Technical Specifications Improvements for Nuclear Power Reactors," dated July 22, 1993 (58 FR 39132), which was subsequently codified by changes to 10 CFR 50.36 (60 FR 36953). Licensees are encouraged to upgrade their TSs consistent with those criteria and conforming, to the practical extent, to Revision 3 to the improved STSs. Licensees adopting portions of the improved STS to existing TSs should adopt all related requirements, as applicable, to achieve a high degree of standardization and consistency.

The safety function of the OPRM is to monitor its local power range monitor (LPRM) signals for signs of neutron flux oscillations. The OPRM also monitors simulated thermal power and recirculation drive flow conditions to automatically enable the OPRM Upscale Function when in a predefined region of the power-to-flow map. The OPRM Upscale Function initiates a trip

whenever an instability condition is detected when in the predefined region of the power-to-flow map.

3.0 TECHNICAL EVALUATION

To support activation of the OPRM portion of the PRNM system, the licensee proposed changes to LGS TSs 2.2.1, 3/4.3.1, 3/4.3.6, 3/4.4.1, 6.9.1, and the associated TS Bases. The TS changes provide operability requirements, limiting conditions for operation (LCOs), and surveillance requirements (SRs) for the OPRM trip functions.

3.1 TS 2.2.1, Reactor Protection System Instrumentation Setpoints

The licensee proposed to add the OPRM Upscale Function to LGS TS Table 2.2.1-1. The licensee also proposed to add a note reference "****" which states "See [core operating limits report] COLR for OPRM period based detection algorithm trip setpoints. OPRM Upscale trip output auto-enable (not bypassed) setpoints shall be APRM Simulated Thermal Power \leq 30% and recirculation drive flow $<$ 60%," and the notation "N.A." to TS Table 2.2.1-1 for the associated trip setpoint and allowable values.

The staff reviewed the proposed changes to TS Table 2.2.1-1 to support the activation of the OPRM Upscale Function. In its application, the licensee stated that there are no allowable values associated with the OPRM Upscale Function. By letter dated January 19, 2005, the NRC staff issued a request for additional information (RAI) that requested further explanation on how the operability of the OPRM Upscale Function is determined in absence of the allowable values. In its RAI response dated February 18, 2005, the licensee stated that the OPRM system is a subsystem of the digital-based GE NUMAC PRNM system and is consistent with the NRC-approved LTR NEDC-32410P-A, which implements the BWROG Stability Long-Term Solution Option III. The licensee stated that the input signals to the OPRM system (i.e., LPRM signals) are continuously self-normalized such that the OPRM PBDA amplitude setpoint is based on a relative comparison to a value of unity (one). As such, the licensee stated that the OPRM system is not subject to uncertainty due to LPRM drift or inoperability that is typically attributable to analog systems, and that the PBDA confirmation counts are discretely determined and counted by the digital system. The licensee stated that allowable values are not required because the OPRM system utilizes analytically determined trip setpoints.

In its application, the licensee also stated that the OPRM PBDA upscale trip setpoints are determined using the NRC-approved Option III licensing methodology described in NEDO-32465-A. The minimum operable OPRM cells setpoint (23) is defined by GE analyses based on the licensee's selection of the OPRM cell assignments and a minimum of two LPRMs per cell. The setpoint is established to conform to NEDO-31960-A (including Supplement 1) and NEDO-32465-A, and is consistent with the guidance provided in NEDC-32410P-A. Further, the licensee stated that the TS-related setpoints for the auto-enable (not-bypassed) region are established as nominal setpoints only.

By letter dated June 29, 2001, GE submitted a 10 CFR Part 21, "Reporting of Defects and Noncompliances," notification regarding a concern that stability reload licensing calculations, using the generic delta critical power ratio over initial minimum critical power ratio (MCPR) versus oscillation magnitude (DIVOM) curve, could result in OPRM reactor trip system (RTS) trip setpoints which may not protect MCPR safety limit. By letter dated September 30, 2003,

the BWROG submitted a resolution for the Part 21 notification requiring licensees to use a plant-specific DIVOM curve, which will be generated or confirmed for each reload fuel cycle consistent with the process described in NEDO-32465-A. The staff determined that plant-specific curves are reasonably conservative, but are not necessarily bounding for a particular fuel cycle. In conjunction with the 95/95 statistical approach of the methodology in NEDO-32465-A, the staff determined that plant-specific DIVOM curves will result in a high probability that the fuel cladding integrity safety limit will not be violated as a result of instability events. In the February 18, 2005, response to the staff's RAI, the licensee indicated its intent to use a plant-cycle-specific DIVOM curve based on the methodology in Section 4.4 of NEDO-32465-A, with the exception of the use of plant-cycle-specific parameters in place of the generic fleet parameters.

Based on the discussion above, the staff finds the implementation of the proposed OPRM Upscale PBDA trip setpoint is consistent with the guidance in the aforementioned LTRs. Since the OPRM Upscale trip setpoint can change with each new fuel cycle, the staff finds it acceptable to document the setpoint in the COLR. Therefore, the staff has determined that the proposed changes to add the OPRM Upscale Function and associated note to TS Table 2.2.1-1 are acceptable.

The licensee also proposed a non-OPRM-related change to TS Table 2.2.1-1. The proposed change would reformat the single loop operation (SLO) equation for the trip setpoint and allowable values indicated in TS Table 2.2.1-1. The licensee proposed to show the SLO equation in the form $0.66(W - 7.6\%) + \text{offset value}$, with the offset value the same for both SLO and two-loop operation (TLO). In addition, the licensee proposed to add an associated notation to the table addressing the limits of applicability. The notation states "The 7.6% flow "offset" for [SLO] is applied for $W \geq 7.6\%$. For flows $< 7.6\%$, the $(W - 7.6\%)$ term is set equal to zero."

The licensee stated in the application that no TS change related to SLO is required to implement the OPRM Upscale Function. However, the licensee proposed to modify the form of the setpoint equation expression to properly describe the system's calculation of the SLO setpoint. The licensee stated that the revised representation, while mathematically equivalent, states the equation in the same form that is actually implemented in the equipment. The staff has reviewed the proposed changes to the SLO equation and associated note and determined that the change is considered a clarification to the existing TS requirement. Therefore, the staff finds the proposed changes acceptable.

3.2 TS 3/4.3.1, Reactor Protection System Instrumentation

To support the implementation of the OPRM Upscale Function, the licensee provided the following discussion related to the proposed changes to TS 3/4.3.1.

B.1 Functions

This modification has no impact on any of the existing PRNM functions. The OPRM monitoring function is currently installed and fully functional but is not connected to the associated [RPS] or trip annunciator circuitry. The only change in this modification is connecting the existing OPRM trip outputs in series with the [APRM] trip outputs. This series output configuration produces a logical "OR" relationship between the OPRM trip outputs and the existing APRM trip

outputs to RPS.

A new OPRM Upscale Function 2.f will be added to Table 3.3.1-1.

B.2 Minimum Number of Operable OPRM Channels

The required minimum number of operable OPRM channels will be three channels.

The OPRM Upscale Function will have operability requirements associated with OPRM cells of a minimum of 2 operable LPRMs per cell for a cell to be operable and a minimum of 23 OPRM cells per OPRM channel for channel operability. The specific numerical values for these two parameters are identified as "plant specific" in the NUMAC PRNM LTRs.

B.3 Applicable Operational Conditions

The new OPRM Upscale Function is safety-related and will be required to be operable only with reactor power \leq 25% of Rated Thermal Power (RTP).

B.4 Channel Check Surveillance Requirements

The new OPRM Upscale Function will have a Channel Check requirement with a frequency of "D" (once per 24 hours).

B.5 Channel Functional Test Surveillance Requirements

The new OPRM Upscale Function will have a Channel Functional Test requirement with a frequency of "SA" (184 days). The Channel Functional Test requirement includes both the OPRM channels and the 2-Out-Of-4 Voter channels plus the flow input function, excluding the flow transmitters. Note "e" will be referenced for Function 2.f in Table 4.3.1.1-1 to show that the flow input function, except for the flow transmitter, is also included in the Function 2.f Surveillance Requirement [SR]. The NUMAC PRNM LTR Supplement 1 includes this requirement only for the APRM Simulated Thermal Power function, but it has been included for the OPRM Upscale Function for LGS since that function uses flow for the auto-enable function.

B.6 Channel Calibration Surveillance Requirements

The new OPRM Upscale Function will have a Channel Calibration requirement with a frequency of "R" (24 months). A separate LPRM calibration requirement (Table 4.3.1.1-1, Note f) with a frequency of every 1000 effective full power hours applied at the "Function 2" (APRM) level will also apply to the OPRM Upscale Function. Table 4.3.1.1-1, Note g, will also be applied to the OPRM Upscale Function to require Channel Calibration of the recirculation loop flow input function, the same as the current requirement for APRM Simulated Thermal Power - Upscale Function. The NUMAC PRNM LTR Supplement 1 shows Note g only against the APRM Simulated Thermal Power - Upscale

Function, but since the flow is used in the OPRM trip auto-enable function, Note g should also apply to the OPRM Upscale Function. (See item B.9 below for related discussion of addition of Note c.)

B.7 Response Time Testing Surveillance Requirements

The new OPRM Upscale Function will have no Response Time Testing [SR]. However, the response time testing for the 2-Out-Of-4 Voter including the output relays to RPS must be modified to account for the OPRM Upscale Function outputs. This is accomplished by revising Note "*" to Table 3.3.1-2 to redefine "N", and by additional discussion in TS Bases 3/4.3.1 to clarify the sequence of testing. This testing is consistent with the sequencing described in the NUMAC PRNM LTR Supplement 1. Specifically, the testing procedure for the 2-Out-Of-4 Voter function will alternate testing of the voter OPRM output with the voter APRM output except the net testing rate for the components is twice the rate required by the LTR. This testing rate was submitted as part of the LGS PRNM modification license amendment request to the NRC in a letter dated February 11, 2000, and approved by the NRC in a Safety Evaluation Report (SER) dated April 12, 2000 [...].

B.8 Logic System Functional Testing (LSFT) Surveillance Requirements

The new OPRM Upscale Function will have no LSFT [SR]. However, the SR 4.3.1.2 requirements applicable to the 2-Out-Of-4 Voter, Function 2.e will be modified slightly to add "OPRM" to show that the simulated trip conditions must include the OPRM logic as well as the APRM Upscale/Inop logic. This clarification is required because the 2-Out-Of-4 Voter, Function 2.e, votes the OPRM Upscale trip independently from the APRM Upscale/Inop trip. The TS Bases 3/4.3.1 description for Function 2.e will be modified to document the independent voting of the OPRM and APRM trips. TS Bases description additions will clarify that the 2-Out-Of-4 Voter Function does not need to be declared inoperable if portions of the Two-Out-Of-Four Logic Module hardware that are not part of the 2-Out-Of-4 Voter are found to be inoperable. The proposed TS Bases wording for Function 2.e is somewhat different from, but consistent with the intent of, the NUMAC PRNM LTRs.

B.9 Verify OPRM Auto-Enable Setpoints

The new OPRM Upscale Function will have a new [SR], Note c to Table 4.3.1.1-1, to confirm, with a frequency of "R" (24 months), that the OPRM auto-enable setpoints are correctly set. This addition is consistent with the NUMAC PRNM LTR Supplement 1 except for some minor rewording of the notation to improve clarity.

B.10 LCO Conditions and Actions

LCO 3.3.1 Actions a and b apply to the OPRM Upscale Function 2.f the same as for the APRM Functions 2.a, 2.b., 2.c and 2.d. Action c does not apply to Function 2.f. Therefore, the "Notes" for Actions a, b and c will be modified to

add "2.f," consistent with the NUMAC PRNM LTR Supplement 1.

New Action Statement 10, which includes sub-actions 10a and 10b, will be defined for Table 3.3.1-1. The new Actions apply to the OPRM Upscale Function when the required completion times for LCO 3.3.1 Action a or b are not met, or when the Function is not available due to fewer than two operable OPRM channels. Action Statement 10a applies when the Function is not available due to an unanticipated characteristic of the instability detection algorithm or equipment that would render all OPRM channels inoperable, and allows a completion time of 12 hours to initiate alternate methods of detecting and suppressing instabilities, and a completion time of 120 days to restore the OPRM operability. Action Statement 10b applies for conditions other than those specified in Action Statement 10a, or when the allowable completion times for Action Statement 10a are not met. Action Statement 10b will allow 4 hours to reduce thermal power to less than 25% RTP.

The alternate method for detection and suppression required by Action Statement 10a is intended to be temporary re-establishment of the ICAs, but controlled by plant procedures rather than TS.

Action Statements 10a and 10b are consistent with the intent of the Actions as described in the Improved Technical Specifications Bases section of the NUMAC PRNM LTR.

- B.11 To more clearly state the TS 3.3.1 Action requirements and application of the notations provisions, the existing Note (n) to Table 3.3.1-1 is being moved as a new footnote "****" to the Action b. and Action c. for TS 3.3.1. The movement of the notation does not make any technical change to the TS requirements, but more clearly relates the note to the applicable Action statements. This change is not related to OPRM and is not covered in the NUMAC PRNM LTRs, but is being made concurrently to eliminate ambiguity in the intent and application of the note. No TS Bases changes are involved in this TS change.

TS 3/4.3.1 LCOs

The staff reviewed the proposed changes to the TS 3/4.3.1 LCOs to add Function 2.f to the notes for Action a, b, and c; to insert the existing notation "(n)" from Table 3.3.1-1; and to capitalize the letter "a" in the word "action" in Action d. The staff determined that the revisions to the notes for Action a, b, and c to add Function 2.f are consistent with NEDC-32410P-A, Supplement 1. The existing Note (n) to TS Table 3.3.1-1 is being moved to create a new footnote "****" to Actions b and c of TS 3.3.1 to clarify the action requirements and notations. The staff determined that this change and the proposed change to Action d are both editorial in

nature. Based on the discussion above, the staff determined that the proposed changes to TS 3.3.1 are acceptable.

TS 3/4.3.1 SRs

The staff reviewed the proposed changes to TS 3/4.3.1 SRs to add Function 2.f and OPRM to TS 4.3.1.2. The staff has determined that these changes reflect the associated surveillance for the OPRM Upscale Function implemented in accordance with NEDC-32410P-A, Supplement 1. SR 4.3.1.2 is required to be performed at least once-per-24 months (normally is performed every refueling outage). However, the licensee must perform the LSFT before activation of the OPRM Upscale trip. The LSFT surveillance is normally performed during an outage because the test creates a full RPS trip. Since the licensee plans to activate the OPRM Upscale trip function during full-power operation, this surveillance cannot be performed. In its application, the licensee requested to perform this surveillance as it applies to the OPRM Upscale trip function, during the next refueling outage after the OPRM Upscale trip is activated. In the application, the licensee identified that the alternatives for performing the surveillance at power have significant risks. The licensee provided a justification to this request on the following basis: (1) GE's evaluation determined that the channel functional test performed and the automatic self-test of the voting logic provide the full overlap of the LSFT, (2) an equivalent OPRM LSFT was done during the factory acceptance test and a normal LSFT on the APRM high-inop voting logic testing was done without detecting any problems, and (3) the extensive operating experience at other BWR plants has not resulted in any voting logic test failures. Based on the discussion above, the staff finds the licensee's proposed changes to TS 4.3.1.2 acceptable. In addition, the staff finds the licensee's justification for performing this surveillance, as it applies to the OPRM Upscale trip function, during the refueling outage following installation meets the intent of the LSFT, and is, therefore, acceptable.

TS Table 3.3.1-1

The staff reviewed the proposed changes to TS Table 3.3.1-1 to add the OPRM Upscale Function and the associated applicable operational conditions, minimum operable channels per trip system, and actions. As indicated above, the proposed change also includes moving the existing TS Table 3.3.1-1 Note "(n)" to the footnote "***" for Actions b and c of TS 3.3.1. In addition, the proposed changes include adding "Action 10" to the Action statements, adding "3(m)" for the minimum operable channels per trip system and associated table note reference, and adding notes, "(o)" and "(p)," for the limits of applicability for operational conditions.

The staff determined that the proposed addition of the OPRM Upscale Function to TS Table 3.3.1-1 is consistent with the changes necessary for implementation of the function in accordance with NEDC-32410P-A, Supplement 1. TS 3.3.1, LCO Actions a and b, address situations when OPRM trip capability is not maintained. In the January 19, 2005, RAI, the staff requested additional information regarding the alternate method to detect and suppress oscillations proposed in Action 10a. In its response, the licensee stated that alternate methods for detecting and suppressing core thermal-hydraulic instabilities (THI) required by TS Table 3.3.1-1, Action 10.a, will be implemented by performance of a newly created back-up stability solution operations strategy to be implemented by procedure when it has been determined that a common mode deficiency exists in the OPRM system that has rendered all four OPRM channels inoperable at once. The licensee stated that the new strategy, which will remain in effect until the OPRM system has been returned to OPERABLE status, will contain actions

similar to those currently in effect at LGS relative to THI monitoring and avoidance. In the safety evaluation for NEDC-32410P-A, the staff acknowledged that it would take a significant period of time to arrange a contract with the OPRM software developer to determine the cause of an OPRM system error, repair the defect, test the software modification, and implement the software upgrade in the plant. Pursuant to proposed Action 10a, the plant would be allowed 12 hours to initiate interim corrective actions (ICAs) and to continue operation for up to 120 days under the ICAs while the software was being upgraded. Based on the discussion above, the staff determined that this proposed change is consistent with the intent of the actions in the LTR and will avoid unnecessary plant shutdowns and unnecessary TS changes while maintaining plant safety, and, therefore, is acceptable.

The licensee's proposed Action 10b requires the plant to reduce thermal power to less than 25% within 4 hours if the required action and completion time of Action 10a are not met. The staff determined that the licensee's proposed actions in Action 10b are consistent with those actions described in NEDC-32410P-A, Supplement 1, and, therefore, are acceptable.

The licensee proposed to add a requirement of 3 operable channels for the minimum operable channels per trip system. The licensee also proposed to add an associated table notation, "(m)," for the OPRM Upscale Function that states; "each APRM channel provides inputs to both trip systems." The staff determined that the licensee's selection of 3 operable OPRM channels is consistent with the NUMAC PRNM LTRs. In addition, the staff determined that the proposed table notation "(m)" is consistent with the NUMAC PRNM system configuration, including the OPRM. Therefore, the staff finds the proposed OPRM Upscale Function minimum operable channels per trip system requirement acceptable.

The licensee proposed to add the limits of applicability for operational conditions as discussed above in proposed table notations, "(o)" and "(p)." Proposed notation "(o)" states; "With THERMAL POWER \leq 25% RATED THERMAL POWER. The OPRM Upscale trip output shall be automatically enabled (not bypassed) when APRM Simulated Thermal Power is \leq 30% and recirculation drive flow is $<$ 60%. The OPRM trip output may be automatically bypassed when APRM Simulated Thermal Power is $<$ 30% or recirculation drive flow is \leq 60%." Proposed notation "(p)" states; "A minimum of 23 cells, each with a minimum of 2 OPERABLE LPRMs, must be OPERABLE for an OPRM channel to be OPERABLE." The staff determined that this proposed change is consistent with the design of the OPRM function as described in NEDC-32410P-A, and, therefore, is acceptable.

TS Table 3.3.1-2

The licensee proposed changes to TS Table 3.3.1-2 to add the OPRM Upscale Function and a modification to the table notes. The staff determined that the proposed addition of the OPRM Upscale Function to TS Table 3.3.1-2 is consistent with the changes necessary to implement the function in accordance with NEDC-32410P-A, Supplement 1. The licensee noted that NEDC-32410P-A describes response time testing as including the output relays for the 2-out-of-4 voter; however, the original license amendment request for PRNM system installation provided justification for response time testing from the PRNM panel terminals for LGS. This was based on the current response time testing commitments for LGS. The staff approved this testing in Amendment No. 141 and Amendment No. 109 for LGS Units 1 and 2, respectively. Since the OPRM Upscale trip outputs are in series with the APRM high-inop trip outputs, the staff determined that no change is required to the 2-out-of-4 voter function response time

testing requirements. The staff also determined that the modification to the table note to add the statement; "but the OPRM and APRM outputs are considered to be separate channels, so N=8. Testing of OPRM and APRM outputs shall alternate," is necessary to account for the implementation of the OPRM Upscale Function outputs. Therefore, the staff determined that the proposed changes to TS Table 3.3.1-2 are acceptable.

TS Table 4.3.1.1-1

The licensee proposed changes to TS Table 4.3.1.1-1 to add the OPRM Upscale Function, associated SRs, and modifications to the table notes. The staff determined that the proposed addition of the OPRM Upscale Function to TS Table 4.3.1.1-2 is consistent with the changes necessary to implement the function in accordance with NEDC-32410P-A, Supplement 1. The licensee proposed SRs (channel check once-per-24 hours); channel functional testing (once-per-184 days) that includes the flow input function, but excludes the flow transmitter; and channel calibrations that include the flow input function. This provides verification that the OPRM Upscale trip auto-enable (not-bypass) setpoint for APRM simulated thermal power is $\leq 30\%$ and for recirculation drive flow is $< 60\%$. The LGS units have a 24-month refueling interval and surveillances are required with thermal power $\leq 25\%$ rated thermal power. The staff determined that these surveillances are equivalent to or more conservative than the corresponding SRs in NEDC-32410P-A, Supplement 1; therefore, the staff finds the proposed surveillance intervals acceptable.

3.3 TS 3/4.3.6, Control Rod Block Instrumentation

To support the implementation of the OPRM Upscale Function, the licensee provided the following discussion related to the proposed changes to TS 3/4.3.6.

- C.1 A minor non-OPRM related change is being made to Table 3.3.6-2 to show the [SLO] equation in the form $0.66(W - \text{offset}) + \text{offset}$ value, with the offset value the same for both SLO and [TLO]. Currently, the equations are shown in the form $0.66W + \text{offset}$ value, with 5% difference in offset values for SLO vs. TLO. In the reformatted representation, offset equals zero for TLO and 7.6% for SLO ($7.6\% = 5\%/0.66$). The revised representation, while mathematically equivalent, states the equation in the same form that is actually implemented in the equipment. In addition, a notation has been added to Table 3.3.6-2 addressing the limits of application of the flow offset. No change related to SLO is required for the OPRM Upscale Function implementation. However, the form of this setpoint expression is being modified to address a TS concern identified during the system's installation at LGS. The concern involves the system's miscalculation of this equation when indicated recirculation drive flow (W) becomes less than offset . Although this flow condition is not operationally possible, proper description of the system's calculation of the single loop setpoint was deemed to be warranted.
- C.2 To make the Intermediate Range Monitor (IRM) rod block OPERATIONAL CONDITION (OPCON) 5 operability requirements consistent with the current IRM RPS OPCON 5 operability requirements, footnote "****" will be added for Functions 4.a, 4.b, 4.c and 4.d in Tables 3.3.6-1 and 4.3.6-1. The existing footnote "****" for these two tables is the same, and is consistent with the

equivalent Note "(i)" requirement for RPS for OPCON 5. This change is not related to OPRM and is not covered in the NUMAC PRNM LTRs, but is being made concurrently to eliminate an inconsistency between the RPS and rod block TS. No TS Bases changes are involved in this TS change

The staff reviewed the proposed changes to TS Tables 3.3.6-1 and 4.3.6-1 to add the note "***" to the Mode 5 operational applicability for IRM Functions 4.a., 4.b., 4.c., 4.d. The referenced note "***" for both tables states "With more than one control rod withdrawn. Not applicable to control rods removed per Specification 3.9.10.1 or 3.9.10.2." The staff agrees with the licensee's assessment that this change would eliminate inconsistency between the RPS and the rod block TSs. The proposed change does not modify the TS operating conditions for which the IRMs requirements apply. Therefore, the staff finds the proposed changes to TS Tables 3.3.6-1 and 4.3.6-1 acceptable.

The staff also reviewed the licensee's proposed change to TS Table 3.3.6-2 to reformat the SLO equation for the APRM trip function setpoint and allowable values and to add an associated note addressing the limits of applicability. The notation states "The 7.6% flow "offset" for [SLO] is applied for $W \geq 7.6\%$. For flows $< 7.6\%$, the $(W-7.6\%)$ term is set equal to zero." The staff has reviewed the proposed changes to the SLO equation and associated note and determined that the change is considered a clarification to the existing TS requirement. The staff also determined that the proposed change is consistent with the change proposed to clarify the equation in TS Table 2.2.1-1 discussed above. Therefore, the staff finds the proposed changes acceptable.

3.4 TS 3/4.4.1, Recirculation System

In its application, the licensee provided the following discussion related to the proposed changes to TS 3/4.4.1.

D.1 LCO Conditions and Actions

LCO restrictions on [the] operating region (references to 45% core flow and Figure 3.4.1.1-1) will be deleted from the LCO (the TS Index will also be revised to reflect the deletion of Figure 3.4.1.1-1). Actions c. and d. and Surveillances 4.4.1.1.3 and 4.4.1.1.4d, each associated with operation in the restricted zone and included previously as part of the ICAs, will be deleted. Similarly, Action b. will be modified to delete the 2-hour action associated with exiting the restricted zone. These changes, along with deletion of the related TS Bases discussions, effectively delete the TS requirements for the ICAs. The NUMAC PRNM LTRs do not address deletion of ICA related TS. Therefore, all TS 3/4.4.1 changes are beyond those covered by the NUMAC PRNM LTRs.

D.2 In addition to deletion of requirements to exit the restricted zone within 2 hours, Action b. has been simplified to require only that the plant be in at least Hot Shutdown within 12 hours. This change, which is beyond the change required to activate the OPRM Upscale Function, does not increase the total time allowed to reach Hot Shutdown, but removes the requirement to be in Startup within the first 6 hours. This change makes the LGS TS 3.4.1.1 allowed completion time for this Action consistent with a similar allowed Action completion time for LGS

TS 3.4.1.2 (jet pumps inoperable) and the completion time for the equivalent Required Action in the [STS].

The staff reviewed the licensee's proposed changes to delete requirements "a." and "b." from the LCO requirement statement; to delete TS 3.4.1.1 Actions c. and d., SR 4.4.1.1.3, and SR 4.4.1.1.4d.; to delete the associated note "***" to TS 3/4.4.4.1; to delete TS Figure 3.4.1.1-1; and to modify the Action b. requirements in TS 3.4.1.1. Figure 3.4.1.1-1 will also be removed from the TS Index consistent with the proposed deletions. The TS 3/4.1.1 requirements, actions, note, figure, and SRs are related to operating requirements associated with ensuring stability. These TSs are also related to the current ICAs at LGS for instability prevention. The staff determined that implementation of the OPRM system in accordance with the NRC-approved LTRs replaces the manual actions for ensuring stability in the TSs proposed for deletion with automatic actions supplied by the OPRM system. The staff also determined that the licensee will develop guidance on how and when to monitor for THI and will provide detailed power-to-flow operating maps that depict "Immediate Exit" and "Immediate Scram" regions of high power and low flow to enable manual operator actions, when the OPRM system is not OPERABLE. This guidance will be consistent with the BWROG backup stability solution guidance committed to by the licensee in its response to GL 94-02. In addition, the licensee has added an action to TS Table 3.3.1-1 to initiate an alternate method to detect and suppress THIs when the OPRM is not OPERABLE. Therefore, the staff finds the proposed deletions in TS 3/4.4.1 acceptable.

The staff also determined that the licensee's proposed change to modify the Action b. requirements in TS 3.4.1.1 is consistent with the staff's expectations since, in the condition with no recirculation loops in operation, the plant must be brought to a MODE in which the LCO does not apply. The licensee proposed that, with no recirculation loops in operation, the plant would only be required to meet a 12-hour action to be in HOT SHUTDOWN, thus, removing the 2- and 6-hour action requirements. The staff determined that the 12-hour completion for this condition is reasonable, based on operating experience, to reach HOT SHUTDOWN from full-power conditions in an orderly manner and without challenging plant systems. The staff also determined that the proposed change is consistent with the action for the LCO in the STSs. Therefore, the staff finds the proposed changes to TS 3.4.1.1 acceptable.

3.5 TS 6.9.1, Routine Reports

In its application, the licensee proposed changes to TS 6.9.1 to add the OPRM Upscale PBDA trip setpoints to the TS requirements for the COLR and a reference to the associated LTR. The licensee stated in the application that the requirement for cycle-specific confirmation or change of the limits is established in the LTRs, but the method of controlling the setpoint limits and documentation is not discussed. A required action in the LTR is to identify the method that will be used. The licensee proposed to add item "h." to TS 6.9.1.9 that states "The Oscillation Power Range Monitor (OPRM) period based detection algorithm (PBDA) setpoints for Specification 2.2.1." In addition, the licensee proposed to add item "b." to TS 6.9.1.10 that states "NEDO-32465-A, "Reactor Stability Detect and Suppress Solutions Licensing Basis Methodology for Reload Applications," August 1996."

The staff has reviewed the proposed changes to TS 6.9.1 and determined that the changes satisfy the LTR requirement to establish cycle-specific confirmation or change of the limits. In addition, the staff determined that the changes are consistent with the TS location for other cycle-specific limits. Therefore, the staff finds the proposed changes acceptable. The other

minor proposed changes to TS 6.9.1 are editorial changes associated with these changes and are acceptable.

3.6 TS Bases

In its application, the licensee proposed several TS Bases changes. The proposed TS Bases changes provide descriptions, clarifying information, and deletions related to the proposed TS changes. The staff does not object to the proposed TS Bases changes.

3.7 Conclusion

Based on the discussion provided above in Sections 3.1 through 3.6, the staff concludes that the proposed changes to LGS Units 1 and 2 TSs 2.2.1, 3/4.3.1, 3/4.3.6, 3/4.4.1, 6.9.1, and the associated TS Bases are acceptable since they are consistent with those needed to support activation of the OPRM portion of the PRNM system per the NRC-approved LTRs. The staff also concludes that other non-OPRM activation-related TSs are acceptable since they clarified the existing requirements, provided consistency among similar TS requirements, were editorial in nature, or were consistent with the STSs.

4.0 STATE CONSULTATION

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

5.0 ENVIRONMENTAL CONSIDERATION

The amendments change a requirement with respect to installation or use of a facility component located within the restricted area as defined in 10 CFR Part 20. 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 (69 FR 62474). 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.

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