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PROPRIETARY INFORMATION – WITHHOLD UNDER 10 CFR 2.390

10 CFR 50.90

NMP2L2589
September 3, 2015

U.S. Nuclear Regulatory Commission
Attention: Document Control Desk
Washington, DC 20555-0001

Nine Mile Point Nuclear Station, Unit 2
Renewed Facility Operating License No. NPF-69
NRC Docket No. 50-410

Subject: License Amendment Request - Safety Limit Minimum Critical Power Ratio Change

In accordance with 10 CFR 50.90, Exelon Generation Company, LLC (EGC) requests a proposed change to modify Technical Specification (TS) 2.1.1 ("Reactor Core SLs"). Specifically, this change incorporates revised Safety Limit Minimum Critical Power Ratios (SLMCPRs) due to the cycle specific analysis performed by Global Nuclear Fuel for Nine Mile Point Nuclear Station, Unit 2 (NMP2), Cycle 16.

The proposed changes have been reviewed by the Nine Mile Point Nuclear Station Plant Operations Review Committee, and approved by the Nuclear Safety Review Board in accordance with the requirements of the EGC Quality Assurance Program.

In order to support the introduction of GNF2 fuel in the upcoming refueling outage in Spring 2015 (N2R15) at NMP2, EGC requests approval of the proposed amendment by March 19, 2016. Once approved, this amendment shall be implemented prior to startup from the refueling outage where GNF2 fuel is loaded. Additionally, there are no commitments contained within this letter.

There are four attachments to this letter. Attachment 1 contains the evaluation of the proposed changes. Attachment 2 provides the marked up TS page. Attachment 3 (letter from Leah D. Crider (Global Nuclear Fuel) to J. Tusar (Exelon Generation Company, LLC), dated July 29, 2015) specifies the new SLMCPRs for NMP2, Cycle 16. Attachment 3 contains information proprietary to Global Nuclear Fuel. Global Nuclear Fuel requests that the document be withheld from public disclosure in accordance with 10 CFR 2.390. An affidavit supporting this request is also contained in Attachment 3. Attachment 4 contains a non-proprietary version of the Global Nuclear Fuel document.

Attachment 3 transmitted herewith contains Proprietary Information.
When separated from Attachment 3, this document is decontrolled.

In accordance with 10 CFR 50.91, EGC is notifying the State of New York of this application for license amendment by transmitting a copy of this letter and its attachments to the designated State Official.

Should you have any questions concerning this letter, please contact Ron Reynolds at (610) 765-5247.

I declare under penalty of perjury that the foregoing is true and correct. Executed on the 3rd day of September 2015.

Respectfully,

James Barstow
Director - Licensing & Regulatory Affairs
Exelon Generation Company, LLC

Attachments:

1. Evaluation of Proposed Changes
2. Markup of Technical Specifications Page
3. Proprietary Version of Global Nuclear Fuel Letter
4. Non-Proprietary Version of Global Nuclear Fuel Letter

cc: USNRC Region I, Regional Administrator
USNRC Senior Resident Inspector, NMP
USNRC Project Manager, NMP
A. L. Peterson, NYSERDA (w/o Attachment 3)

Attachment 1

Evaluation of Proposed Changes

Nine Mile Point Nuclear Station Unit 2

Renewed Facility Operating License No. NPF-69

ATTACHMENT 1

EVALUATION OF PROPOSED CHANGES

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SUBJECT: Safety Limit Minimum Critical Power Ratio Change

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1.0 SUMMARY DESCRIPTION

This evaluation supports a request to amend Renewed Facility Operating License No. NPF-69 for Nine Mile Point Nuclear Station, Unit 2 (NMP2).

The proposed change modifies Technical Specification (TS) 2.1.1 ("Reactor Core SLs"). Specifically, this change incorporates revised Safety Limit Minimum Critical Power Ratios (SLMCPRs) due to the cycle specific analysis performed by Global Nuclear Fuel for the introduction of GNF2 fuel for NMP2, Cycle 16.

2.0 DETAILED DESCRIPTION

The proposed change involves revising the SLMCPRs contained in TS 2.1.1 for two recirculation loop operation and single recirculation loop operation. The SLMCPR value for two recirculation loop operation is being changed from ≥ 1.09 to ≥ 1.15. The SLMCPR value for single recirculation loop operation is being changed from ≥ 1.09 to ≥ 1.15. This change supports the introduction of GNF2 fuel into NMP2 reactor core for Cycle 16.

Marked up TS page 2.0-1, showing the requested changes, is provided in Attachment 2.

3.0 TECHNICAL EVALUATION

The proposed TS change will revise the SLMCPRs contained in TS 2.1.1 for two recirculation loop operation and single recirculation loop operation to reflect the changes in the cycle specific analysis performed by Global Nuclear Fuel for NMP2, Cycle 16.

The new SLMCPRs are calculated using NRC-approved methodology described in NEDE-24011-P-A, "General Electric Standard Application for Reactor Fuel," Revision 21. A listing of the associated NRC-approved methodologies for calculating the SLMCPRs is provided in Section 1.0 ("Methodology") of Attachment 3.

The SLMCPR analysis establishes SLMCPR values that will ensure that during normal operation and during abnormal operational transients, at least 99.9% of all fuel rods in the core do not experience transition boiling if the limit is not violated. The SLMCPRs are calculated to include cycle specific parameters and, in general, are dominated by two key parameters: 1) flatness of the core bundle-by-bundle MCPR distribution, and 2) flatness of the bundle pin-by-pin power/R-Factor distribution. Information supporting the cycle specific SLMCPRs is included in Attachment 3. That attachment summarizes the methodology, inputs, and results for the change in the SLMCPRs. The NMP2, Cycle 16, core will consist of GE14 and GNF2 fuel types as illustrated in Figure 1 of Attachment 3.

No plant hardware or operational changes are required with this proposed change.

4.0 REGULATORY EVALUATION

4.1 Applicable Regulatory Requirements/Criteria

10 CFR 50.36, "Technical specifications," paragraph (c)(1), requires that power reactor facility TS include safety limits for process variables that protect the integrity of certain physical barriers that guard against the uncontrolled release of radioactivity. The SLMCPR analysis establishes SLMCPR values that will ensure that during normal operation and during abnormal operational transients, at least 99.9% of all fuel rods in the core do not experience transition boiling if the limit is not violated. Thus, the SLMCPR is required to be contained in TS.

4.2 Precedents

The NRC has approved SLMCPR changes for a number of plants with a core composition of GE14 and GNF2 fuel:

1) Letter from Robert Martin (U.S. Nuclear Regulatory Commission) to C. R. Pierce (Southern Nuclear Operating Company, Inc.), "Edwin I. Hatch Nuclear Plant, Unit No. 2, Issuance of Amendment Regarding Minimum Critical Power Ratio (TAC NO. MF4588)," dated February 18, 2015

2) Letter from P. Bamford (U.S. Nuclear Regulatory Commission) to M. J. Pacilio (Exelon Generation Company, LLC), "Limerick Generating Station, Unit 2 – Issuance of Amendment RE: Safety Limit Minimum Critical Power Ratio Changes (TAC NO. ME5182)," dated April 5, 2011

3) Letter from J. Hughey (U.S. Nuclear Regulatory Commission) to M. J. Pacilio (Exelon Generation Company, LLC), "Peach Bottom Atomic Power Station, Unit 2 – Issuance of Amendment RE: Safety Limit Minimum Critical Power Ratio Value Change (TAC NO. ME3994)," dated September 28, 2010

4.3 No Significant Hazards Consideration

Exelon Generation Company, LLC (EGC) has evaluated whether or not a significant hazards consideration is involved with the proposed amendment by focusing on the three standards set forth in 10 CFR 50.92, "Issuance of amendment," as discussed below:

1. Does the proposed amendment involve a significant increase in the probability or consequences of an accident previously evaluated?

   Response: No.

   The derivation of the cycle specific Safety Limit Minimum Critical Power Ratios (SLMCPRs) for incorporation into the Technical Specifications (TS), and their use to determine cycle specific thermal limits, has been performed using the methodology discussed in NEDE-24011-P-A, "General Electric Standard Application for Reactor Fuel," Revision 21.

The basis of the SLMCPR calculation is to ensure that during normal operation and during abnormal operational transients, at least 99.9% of all fuel rods in the core do not experience transition boiling if the limit is not violated. The new SLMCPRs preserve the existing margin to transition boiling.

The MCPR safety limit is reevaluated for each reload using NRC-approved methodologies. The analyses for NMP2, Cycle 16, have concluded that a two recirculation loop MCPR safety limit of ≥ 1.15, based on the application of Global Nuclear Fuel's NRC-approved MCPR safety limit methodology, will ensure that this acceptance criterion is met. For single recirculation loop operation, a MCPR safety limit of ≥ 1.15 also ensures that this acceptance criterion is met. The MCPR operating limits are presented and controlled in accordance with the NMP2 Core Operating Limits Report (COLR).

The requested TS changes do not involve any plant modifications or operational changes that could affect system reliability or performance or that could affect the probability of operator error. The requested changes do not affect any postulated accident precursors, do not affect any accident mitigating systems, and do not introduce any new accident initiation mechanisms. Therefore, the proposed TS changes do not involve a significant increase in the probability or consequences of an accident previously evaluated.

2. Does the proposed amendment create the possibility of a new or different kind of accident from any accident previously evaluated?

   Response: No.

   The SLMCPR is a TS numerical value, calculated to ensure that during normal operation and during abnormal operational transients, at least 99.9% of all fuel rods in the core do not experience transition boiling if the limit is not violated. The new SLMCPRs are calculated using NRC-approved methodology discussed in NEDE-24011-P-A, "General Electric Standard Application for Reactor Fuel," Revision 21. The proposed changes do not involve any new modes of operation, any changes to setpoints, or any plant modifications. The proposed revised MCPR safety limits have been shown to be acceptable for Cycle 16 operation. The core operating limits will continue to be developed using NRC-approved methods. The proposed MCPR safety limits or methods for establishing the core operating limits do not result in the creation of any new precursors to an accident. Therefore, this change does not create the possibility of a new or different kind of accident from any previously evaluated.

3. Does the proposed amendment involve a significant reduction in a margin of safety?

   Response: No.

   There is no significant reduction in the margin of safety previously approved by the NRC as a result of the proposed change to the SLMCPRs. The new SLMCPRs are

calculated using methodology discussed in NEDE-24011-P-A, "General Electric Standard Application for Reactor Fuel," Revision 21. The SLMCPRs ensure that during normal operation and during abnormal operational transients, at least 99.9% of all fuel rods in the core do not experience transition boiling if the limit is not violated, thereby preserving the fuel cladding integrity. Therefore, the proposed TS changes do not involve a significant reduction in the margin of safety previously approved by the NRC.

Based on the above, EGC concludes that the proposed amendment does not involve a significant hazards consideration under the standards set forth in 10 CFR 50.92(c), and, accordingly, a finding of no significant hazards consideration is justified.

4.4 Conclusions

In conclusion, based on the considerations discussed above, (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 amendment will not be inimical to the common defense and security or to the health and safety of the public.

5.0 ENVIRONMENTAL CONSIDERATION

A review has determined that the proposed amendment would change a requirement with respect to installation or use of a facility component located within the restricted area, as defined in 10 CFR 20, or would change an inspection or surveillance requirement. However, the proposed amendment does not involve (i) a significant hazards consideration, (ii) a significant change in the types or significant increase in the amounts of any effluent that may be released offsite, or (iii) a significant increase in individual or cumulative occupational radiation exposure. Accordingly, the proposed amendment meets the eligibility criterion for categorical exclusion set forth in 10 CFR 51.22(c)(9). Therefore, pursuant to 10 CFR 51.22(b), no environmental impact statement or environmental assessment need be prepared in connection with the proposed amendment.

6.0 REFERENCES

1) NEDE-24011-P-A, "General Electric Standard Application for Reactor Fuel," Revision 21.

ATTACHMENT 2

Markup of Technical Specifications Page

Revised TS Page

2.0-1 (NMP2)

2.0 SAFETY LIMITS (SLs)

2.1 SLs

2.1.1 Reactor Core SLs

2.1.1.1 With the reactor steam dome pressure < 785 psig or core flow < 10% rated core flow:

THERMAL POWER shall be ≤ 23% RTP.

≥1.15

2.1.1.2 With the reactor steam dome pressure ≥ 785 psig and core flow ≥ 10% rated core flow:

≥1.15

MCPR shall be ~~≥ 1.09~~ for two recirculation loop operation or ~~≥ 1.09~~ for single recirculation loop operation.

2.1.1.3 Reactor vessel water level shall be greater than the top of active irradiated fuel.

2.1.2 Reactor Coolant System Pressure SL

Reactor steam dome pressure shall be ≤ 1325 psig.

2.2 SL Violations

With any SL violation, the following actions shall be completed within 2 hours:

2.2.1 Restore compliance with all SLs; and

2.2.2 Insert all insertable control rods.

ATTACHMENT 4

Non-Proprietary Version of Global Nuclear Fuel Letter

July 2015
GNF-002N8791-R1-NP
PLM Specification 002N8791-R1

GNF Additional Information Regarding the Requested Changes to the Technical Specification SLMCPR

Nine Mile Point Unit 2 Cycle 16

Information Notice

This is a non-proprietary version of the document GNF-002N8791-R1-P, which has the proprietary information removed. Portions of the document that have been removed areindicated by an open and closed bracket as shown here [[ ]].

Important Notice Regarding Contents of this Report
Please Read Carefully

The only undertakings of GNF-A with respect to information in this document are contained in contracts between GNF-A and its customers, and nothing contained in this document shall be construed as changing those contracts. The use of this information by anyone other than those participating entities and for any purposes other than those for which it is intended is not authorized; and with respect to any unauthorized use, GNF-A makes no representation or warranty, and assumes no liability as to the completeness, accuracy, or usefulness of the information contained in this document.

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1.0 Methodology

GNF performs Safety Limit Minimum Critical Power Ratio (SLMCPR) calculations in accordance to NEDE-24011-P-A "General Electric Standard Application for Reactor Fuel" (Revision 21) using the following Nuclear Regulatory Commission (NRC)-approved methodologies and uncertainties:

- NEDC-32601P-A, "Methodology and Uncertainties for Safety Limit MCPR Evaluations," August 1999. (Reference 1)
- NEDC-32694P-A, "Power Distribution Uncertainties for Safety Limit MCPR Evaluations," August 1999. (Reference 2)
- NEDC-32505P-A "R-Factor Calculation Method for GE11, GE12 and GE13 Fuel," Revision 1, July 1999. (Reference 3)

The latter reference is applicable to GNF's current fuel offerings of GE14 and GNF2. Both are 10x10 lattice designs with two water rods, as is GE12.

Table 2 identifies the methodologies used for the Nine Mile Point Unit 2 (NMP2) Cycle 15 and Cycle 16 SLMCPR calculations.

2.0 Discussion

In this discussion, the TLO nomenclature is used for two recirculation loops in operation, and the SLO nomenclature is used for one recirculation loop in operation.

2.1. Major Contributors to SLMCPR Change

The calculated Monte Carlo SLMCPR values for the prior cycle and the current cycle are presented in Table 3. Throughout this report the prior cycle comparisons are from the Cycle 15 Maximum Extended Load Line Limit Analysis Plus (MELLLA+) analysis (Cycle 15 was initially licensed and operated under EPU-only conditions).

In general, the calculated safety limit is dominated by two key parameters: (1) flatness of the core bundle-by-bundle Minimum Critical Power Ratio (MCPR) distribution, and (2) flatness of the bundle pin-by-pin power / R-Factor distribution. Greater flatness in either parameter yields more rods susceptible to boiling transition and thus a higher calculated SLMCPR. MCPR Importance Parameter (MIP) measures the core bundle-by-bundle MCPR distribution and R-Factor Importance Parameter (RIP) measures the bundle pin-by-pin power / R-Factor distribution. The effect of the fuel loading pattern on the calculated TLO SLMCPR has been correlated to the parameter MIPRIP, which combines the MIP and RIP values.

Another factor besides core MCPR distribution or bundle R-factor distribution that significantly affects the SLMCPR is the expansion of the analysis domain that comes with the initial application of MELLLA+. The rated power / minimum core flow point is analyzed at a lower core flow (than without MELLLA+) using increased uncertainties (see Section 2.2.2) that tend to increase the SLMCPR. Also, a new point at off-rated power / off-rated flow is analyzed using the increased uncertainties. It is expected that in most cases this off-rated power / off-rated flow point will set the overall limit.

Table 3 presents the MIP and RIP parameters for the previous cycle and the current cycle along with the TLO SLMCPR estimates using MIPRIP correlations. The MIPRIP prediction is correlated to Monte Carlo results for rated power / rated flow. Predictions for the MELLLA+ domains (at rated power / minimum core flow and off-rated power / off-rated core flow) must be adjusted by an amount estimated to account for the effect of the larger (SLO) uncertainties. In addition, Table 3 presents estimated effects on the TLO SLMCPR due to methodology deviations, penalties, and / or uncertainty deviations from approved values. Based on the MIPRIP correlation and any effects due to deviations from approved values, a final estimated TLO SLMCPR is determined. Table 3 also provides the actual calculated Monte Carlo SLMCPR. Given the bias and uncertainty in the MIPRIP correlation [[ ]] and the inherent variation in the Monte Carlo results [[ ]], the change in the NMP2 Cycle 16 calculated Monte Carlo TLO SLMCPR is consistent with the corresponding estimated TLO SLMCPR value.

The intent of the final estimated TLO SLMCPR is to provide an estimate to check the reasonableness of the Monte Carlo result. It is not used for any other purpose. The methodology and final SLMCPR is based on the rigorous Monte Carlo analysis.

The items in Table 3 that result in the increase of the estimated SLMCPR are discussed in Section 2.2.

Cycle 16 will be the first full reload of GNF2 for NMP2. The critical power uncertainty for GNF2 is defined in Table 6. As seen in Table 6, the critical power uncertainty for GNF2 is higher than the previous cycle's fuel type (GE14). As such, the GEXL uncertainty of the new fuel type tends to make the final SLMCPR higher.

2.2. Deviations in NRC-Approved Uncertainties

Tables 4 and 5 provide a list of NRC-approved uncertainties along with values actually used. A discussion of deviations from these NRC-approved values follows, all of which are conservative relative to NRC-approved values. Also, estimated effect on the SLMCPR is provided in Table 3 for each deviation.

2.2.1. R-Factor

At this time, GNF has generically increased the GEXL R-Factor uncertainty from [[ ]] to account for an increase in channel bow due to the emerging unforeseen phenomena called control blade shadow corrosion-induced channel bow, which is not accounted for in the channel bow uncertainty component of the approved R-Factor uncertainty. The step "σ RPEAK" in Figure 4.1 from NEDC-32601P-A, which has been provided for convenience in Figure 3 of this attachment, is affected by this deviation. Reference 4 technically justifies that a GEXL R-Factor uncertainty of [[ ]] accounts for a channel bow uncertainty of up to [[ ]].

NMP2 has experienced control blade shadow corrosion-induced channel bow to the extent that an increase in the NRC-approved R-Factor uncertainty [[ ]] is deemed prudent to address its effect. Accounting for the control blade shadow corrosion-induced channel bow, the NMP2 Cycle 16 analysis shows an expected channel bow uncertainty of [[ ]], which is bounded by a GEXL R-Factor uncertainty of [[ ]]. Thus the use of a GEXL R-Factor uncertainty of [[ ]] adequately accounts for the expected control blade shadow corrosion-induced channel bow for NMP2 Cycle 16.

2.2.2. Core Flow Rate and Random Effective TIP Reading

In Reference 5, GNF committed to the expansion of the state points used in the determination of the SLMCPR. Consistent with the Reference 5 commitments, GNF performs analyses at the rated core power and minimum licensed core flow point in addition to analyses at the rated core power and rated core flow point. The approved SLMCPR methodology is applied at each state point that is analyzed.

For the TLO calculations performed in the MELLLA+ domain at rated power / minimum core flow and off-rated power / off-rated core flow, the approved uncertainty values for the core flow rate (2.5%) and the random effective Traversing In-core Probe (TIP) reading (1.2%) are conservatively adjusted by using the SLO uncertainty values of 6.0% and 2.85% for the core flow rate and random effective TIP reading respectively. The steps "σ CORE FLOW" and "σ TIP (INSTRUMENT)" in Figure 4.1 from NEDC-32601P-A, which has been provided for convenience in Figure 3 of this attachment, are affected by this deviation, respectively.

The treatment of the core flow and random effective TIP reading uncertainties is based on the assumption that the signal to noise ratio deteriorates as core flow is reduced. GNF believes this is conservative.

2.2.3. Flow Area Uncertainty

GNF has calculated the flow area uncertainty for GNF2 and GE14 using the process described in Section 2.7 of Reference 1. It was determined that the flow area uncertainty for GNF2 and GE14 would be conservatively bounded by a value of [[ ]]. Because this is larger than the

Reference 1 value of [[ ]] the bounding value was used in the SLMCPR calculations. The effect of this change is considered not significant (i.e., < 0.005 increase on SLMCPR).

2.3. Departure from NRC-Approved Methodology

No departures from NRC-approved methodologies were used in the NMP2 Cycle 16 SLMCPR calculations.

2.4. Fuel Axial Power Shape Penalty

At this time, GNF has determined that higher uncertainties and non-conservative biases in the GEXL correlations for the various types of axial power shapes (i.e., inlet, cosine, outlet and double hump) could potentially exist relative to the NRC-approved methodology values (References 6, 7, 8 and 9). The following table identifies, by marking with an "X", this potential for each GNF product line currently in use:

[[

]]

Axial bundle power shapes corresponding to the limiting SLMCPR control blade patterns are determined using the PANACEA Three-Dimensional (3D) core simulator. These axial power shapes are classified in accordance to the following table:

[[

]]

If the limiting bundles in the SLMCPR calculation exhibit an axial power shape identified by this table, GNF penalizes the GEXL critical power uncertainties to conservatively account for the effect of the axial power shape. Table 6 provides a list of the GEXL critical power uncertainties

determined in accordance to the NRC-approved methodology contained in NEDE-24011-P-A along with values actually used.

For the limiting bundles, the fuel axial power shapes in the SLMCPR analysis were examined to determine the presence of axial power shapes identified in the above table. These power shapes were not found; therefore, no power shape penalties were applied to the calculated NMP2 Cycle 16 SLMCPR values.

2.5. Methodology Restrictions

The four restrictions identified on page 3 of NRC's Safety Evaluation relating to the General Electric Licensing Topical Reports (LTRs) NEDC-32601P, NEDC-32694P, and Amendment 25 to NEDE-24011-P-A (March 11, 1999) are addressed in References 6, 10, 11, and 12.

The four restrictions for GNF2 were determined acceptable by the NRC review of "GNF2 Advantage Generic Compliance with NEDE-24011-P-A (GESTAR II), NEDC-33270P, Revision 0, FLN-2007-011, March 14, 2007." Specifically, in the NRC audit report (ML081630579) for the said document, Section 3.4.1 page 59 states:

> "The NRC staff's SE of NEDC-32694P-A (Reference 19 of NEDC-33270P) provides four actions to follow whenever a new fuel design is introduced. These four conditions are listed in Section 3.0 of the SE. The analysis and evaluation of the GNF2 fuel design was evaluated in accordance with the limitations and conditions stated in the NRC staff's SE, and is acceptable."

GNF's position is that GNF2 is an evolutionary fuel product based on GE14. It is not considered a new fuel design as it maintains the previously established 10x10 array and two water rods makeup, as stated by the NRC audit report (ML081630579), Section 3.4.2.2.1 Page 59:

> "The NRC staff finds that the calculational methods, evaluations and applicability of the OLMCPR and SLMCPR are in accordance with existing NRC-approved methods and thus valid for use with GNF2 fuel."

As such, no new GNF fuel designs are being introduced in NMP2 Cycle 16; therefore, the NEDC-32505P-A statement "...if new fuel is introduced, GENE must confirm that the revised R-Factor method is still valid based on new test data" is not applicable.

2.6. Minimum Core Flow Condition

For NMP2 Cycle 16, the most limiting SLMCPR calculation occurred at the 77.6% rated power / 55.0% rated flow point. At low core flows, the search spaces for the limiting rod pattern and the nominal rod pattern are essentially the same. Additionally, the condition that MIP [[
]] establishes a reasonably bounding limiting rod pattern. Hence, the

rod pattern used to calculate the SLMCPR at 77.6% rated power / 55.0% rated flow reasonably assures that at least 99.9% of the fuel rods in the core would not be expected to experience boiling transition during normal operation or anticipated operational occurrences during the operation of NMP2 Cycle 16. Consequently, the SLMCPR value calculated from the 77.6% rated power / 55.0% rated core flow condition limiting MCPR distribution reasonably bounds this mode of operation for NMP2 Cycle 16.

2.7. Limiting Control Rod Patterns

The limiting control rod patterns used to calculate the SLMCPR reasonably assure that at least 99.9% of the fuel rods in the core would not be expected to experience boiling transition during normal operation or anticipated operational occurrences during the operation of NMP2 Cycle 16.

2.8. Core Monitoring System

For NMP2 Cycle 16, the 3D MONICORE system will be used as the core monitoring system.

2.9. Power / Flow Map

The utility has provided the current and previous cycle power / flow map in a separate attachment.

2.10. Core Loading Diagram

Figures 1 and 2 provide the core-loading diagram for the current and previous cycle respectively, which are the Reference Loading Pattern as defined by NEDE-24011-P-A. Table 1 provides a description of the core.

2.11. Figure References

Figure 3 is Figure 4.1 from NEDC-32601P-A. Figure 4 is Figure III.5-1 from NEDC-32601P-A. Figure 5 is based on Figure III.5-2 from NEDC-32601P-A, and has been updated with GE14 and GNF2 data.

2.12. Additional SLMCPR Licensing Conditions

For NMP2 Cycle 16, the additional SLMCPR licensing condition is that the SLMCPR shall be established by adding 0.02 to the calculated cycle-specific SLMCPR value (see Table 3) based on the requirements of NEDC-33173P-A Revision 4 (Reference 13).

2.13. 10 CFR Part 21 Evaluation

There are no known 10 CFR Part 21 factors that affect the NMP2 Cycle 16 SLMCPR calculations.

2.14. Summary

The requested changes to the Technical Specification SLMCPR values are 1.15 for both TLO and SLO for NMP2 Cycle 16. This value bounds the calculated results for NMP2 Cycle 16.

3.0 References

1. GE Nuclear Energy, "Methodology and Uncertainties for Safety Limit MCPR Evaluations," NEDC-32601P-A, August 1999.

2. GE Nuclear Energy, "Power Distribution Uncertainties for Safety Limit MCPR Evaluations," NEDC-32694P-A, August 1999.

3. GE Nuclear Energy, "R-Factor Calculation Method for GE11, GE12 and GE13 Fuel," NEDC-32505P-A, Revision 1, July 1999.

4. Letter, John F. Schardt (GNF-A) to U.S. Nuclear Regulatory Commission Document Control Desk with attention to Mel B. Fields (NRC), "Shadow Corrosion Effects on SLMCPR Channel Bow Uncertainty," FLN-2004-030, November 10, 2004.

5. Letter, Jason S. Post (GENE) to U.S. Nuclear Regulatory Commission Document Control Desk with attention to Chief, Information Management Branch, et al. (NRC), "Part 21 Final Report: Non-Conservative SLMCPR", MFN 04-108, September 29, 2004.

6. Letter, Glen A. Watford (GNF-A) to U.S. Nuclear Regulatory Commission Document Control Desk with attention to Joseph E. Donoghue (NRC), "Final Presentation Material for GEXL Presentation – February 11, 2002," FLN-2002-004, February 12, 2002.

7. Letter, Glen A. Watford (GNF-A) to U.S. Nuclear Regulatory Commission Document Control Desk with attention to Alan Wang (NRC), "NRC Technology Update – Proprietary Slides – July 31 – August 1, 2002," FLN-2002-015, October 31, 2002.

8. Letter, Jens G. Munthe Andersen (GNF-A) to U.S. Nuclear Regulatory Commission Document Control Desk with attention to Alan Wang (NRC), "GEXL Correlation for 10X10 Fuel," FLN-2003-005, May 31, 2003.

9. Letter, Andrew A. Lingenfelter (GNF-A) to U.S. Nuclear Regulatory Commission Document Control Desk with cc to MC Honcharik (NRC), "Removal of Penalty Being Applied to GE14 Critical Power Correlation for Outlet Peaked Axial Power Shapes," FLN-2007-031, September 18, 2007.

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60									10	12	10	13	13	10	10	10	10	13	13	10	12	10								
58								10	10	19	15	16	15	16	18	18	16	15	16	15	19	10	10							
56						10	11	10	16	16	17	24	20	24	20	20	24	20	24	17	16	16	10	11	10					
54						10	16	20	24	25	25	25	25	25	25	25	25	25	25	25	25	24	20	16	10					
52					10	15	17	24	25	25	20	25	19	25	20	20	25	19	25	20	25	25	24	17	15	10				
50			10	10	15	18	25	25	25	20	22	18	22	18	23	23	18	22	18	22	20	25	25	25	18	15	10	10		
48			11	16	17	25	18	25	18	23	20	23	19	22	19	19	22	19	23	20	23	18	25	18	25	17	16	11		
46		10	10	20	24	25	25	18	26	20	21	19	22	18	26	26	18	22	19	21	20	26	18	25	25	24	20	10	10	
44	10	10	16	24	25	25	18	26	19	21	17	26	18	26	17	17	26	18	26	17	21	19	26	18	25	25	24	16	10	10
42	12	19	16	25	25	20	23	20	21	17	21	17	26	18	23	23	18	26	17	21	17	21	20	23	20	25	25	16	19	12
40	10	15	17	25	20	22	20	21	17	21	18	21	18	22	17	17	22	18	21	18	21	17	21	20	22	20	25	17	15	10
38	13	16	24	25	25	18	23	19	26	17	21	18	21	19	21	21	19	21	18	21	17	26	19	23	18	25	25	24	16	13
36	13	15	20	25	19	22	19	22	18	26	18	21	17	22	18	18	22	17	21	18	26	18	22	19	22	19	25	20	15	13
34	10	16	24	25	25	18	22	18	26	18	22	19	22	18	21	21	18	22	19	22	18	26	18	22	18	25	25	24	16	10
32	10	18	20	25	20	23	19	26	17	23	17	21	18	21	19	19	21	18	21	17	23	17	26	19	23	20	25	20	18	10
30	10	18	20	25	20	23	19	26	17	23	17	21	18	21	19	19	21	18	21	17	23	17	26	19	23	20	25	20	18	10
28	10	16	24	25	25	18	22	18	26	18	22	19	22	18	21	21	18	22	19	22	18	26	18	22	18	25	25	24	16	10
26	13	15	20	25	19	22	19	22	18	26	18	21	17	22	18	18	22	17	21	18	26	18	22	19	22	19	25	20	15	13
24	13	16	24	25	25	18	23	19	26	17	21	18	21	19	21	21	19	21	18	21	17	26	19	23	18	25	25	24	16	13
22	10	15	17	25	20	22	20	21	17	21	18	21	18	22	17	17	22	18	21	18	21	17	21	20	22	20	25	17	15	10
20	12	19	16	25	25	20	23	20	21	17	21	17	26	18	23	23	18	26	17	21	17	21	20	23	20	25	25	16	19	12
18	10	10	16	24	25	25	18	26	19	21	17	26	18	26	17	17	26	18	26	17	21	19	26	18	25	25	24	16	10	10
16		10	10	20	24	25	25	18	26	20	21	19	22	18	26	26	18	22	19	21	20	26	18	25	25	24	20	10	10	
14			11	16	17	25	18	25	18	23	20	23	19	22	19	19	22	19	23	20	23	18	25	18	25	17	16	11		
12			10	10	15	18	25	25	25	20	22	18	22	18	23	23	18	22	18	22	20	25	25	25	18	15	10	10		
10					10	15	17	24	25	25	20	25	19	25	20	20	25	19	25	20	25	25	24	17	15	10				
8						10	16	20	24	25	25	25	25	25	25	25	25	25	25	25	25	24	20	16	10					
6						10	11	10	16	16	17	24	20	24	20	20	24	20	24	17	16	16	10	11	10					
4								10	10	19	15	16	15	16	18	18	16	15	16	15	19	10	10							
2									10	12	10	13	13	10	10	10	10	13	13	10	12	10								
	1	3	5	7	9	11	13	15	17	19	21	23	25	27	29	31	33	35	37	39	41	43	45	47	49	51	53	55	57	59

Fuel Type			
10=GE14-P10CNAB434-15GZ-120T-150-T6-4039	(Cycle 14)	19=GE14-P10CNAB418-16GZ-120T-150-T6-4243	(Cycle 15)
11=GE14-P10CNAB422-17GZ-120T-150-T6-4041	(Cycle 14)	20=GE14-P10CNAB422-16GZ-120T-150-T6-4244	(Cycle 15)
12=GE14-P10CNAB412-15GZ-120T-150-T6-4040	(Cycle 14)	21=GNF2-P10CG2B389-14GZ-120T2-150-T6-4379	(Cycle 16)
13=GE14-P10CNAB422-17GZ-120T-150-T6-4042	(Cycle 14)	22=GNF2-P10CG2B404-15GZ-120T2-150-T6-4382	(Cycle 16)
15=GE14-P10CNAB430-15GZ-120T-150-T6-4239	(Cycle 15)	23=GNF2-P10CG2B401-14GZ-120T2-150-T6-4381	(Cycle 16)
16=GE14-P10CNAB430-14GZ-120T-150-T6-4240	(Cycle 15)	24=GNF2-P10CG2B417-2G8.0/10G7.0-120T2-150-T6-4384	(Cycle 16)
17=GE14-P10CNAB418-15GZ-120T-150-T6-4241	(Cycle 15)	25=GNF2-P10CG2B416-15GZ-120T2-150-T6-4383	(Cycle 16)
18=GE14-P10CNAB419-17GZ-120T-150-T6-4242	(Cycle 15)	26=GNF2-P10CG2B390-13GZ-120T2-150-T6-4380	(Cycle 16)

Figure 1. Current Cycle Core Loading Diagram

60									7	7	7	8	7	7	7	7	7	7	8	7	7	7								
58								9	10	10	10	10	10	10	13	13	10	10	10	10	10	10	9							
56						7	7	13	16	15	16	15	16	16	12	12	16	16	15	16	15	16	13	7	7					
54						7	12	16	20	14	20	12	18	12	19	19	12	18	12	20	14	20	16	12	7					
52					7	11	15	20	20	18	10	18	12	18	12	12	18	12	18	10	18	20	20	15	11	7				
50			7	7	11	12	20	12	20	10	18	10	20	11	17	17	11	20	10	18	10	20	12	20	12	11	7	7		
48			7	12	15	20	7	20	11	18	14	18	10	18	12	12	18	10	18	14	18	11	20	7	20	15	12	7		
46		8	13	16	20	12	20	13	17	10	18	10	18	11	19	19	11	18	10	18	10	17	13	20	12	20	16	13	8	
44	7	10	16	20	20	20	11	17	13	17	10	19	12	19	12	12	19	12	19	10	17	13	17	11	20	20	20	16	10	7
42	7	10	15	14	18	10	18	10	17	10	17	11	19	12	19	19	12	19	11	17	10	17	10	18	10	18	14	15	10	7
40	7	10	16	20	10	18	11	18	10	17	10	17	10	18	13	13	18	10	17	10	17	10	18	11	18	10	20	16	10	7
38	8	10	15	12	18	10	18	10	19	11	17	11	19	12	17	17	12	19	11	17	11	19	10	18	10	18	12	15	10	8
36	7	10	16	18	12	20	10	18	12	19	10	19	14	17	11	11	17	14	19	10	19	12	18	10	20	12	18	16	10	7
34	7	10	16	12	18	11	18	11	19	12	18	12	17	11	18	18	11	17	12	18	12	19	11	18	11	18	12	16	10	7
32	7	13	12	19	12	17	12	19	12	19	13	17	11	18	12	12	18	11	17	13	19	12	19	12	17	12	19	12	13	7
30	7	13	12	19	12	17	12	19	12	19	13	17	11	18	12	12	18	11	17	13	19	12	19	12	17	12	19	12	13	7
28	7	10	16	12	18	11	18	11	19	12	18	12	17	11	18	18	11	17	12	18	12	19	11	18	11	18	12	16	10	7
26	7	10	16	18	12	20	10	18	12	19	10	19	14	17	11	11	17	14	19	10	19	12	18	10	20	12	18	16	10	7
24	8	10	15	12	18	10	18	10	19	11	17	11	19	12	17	17	12	19	11	17	11	19	10	18	10	18	12	15	10	8
22	7	10	16	20	10	18	11	18	10	17	10	17	10	18	13	13	18	10	17	10	17	10	18	11	18	10	20	16	10	7
20	7	10	15	14	18	10	18	10	17	10	17	11	19	12	19	19	12	19	11	17	10	17	10	18	10	18	14	15	10	7
18	7	10	16	20	20	20	11	17	13	17	10	19	12	19	12	12	19	12	19	10	17	13	17	11	20	20	20	16	10	7
16		8	13	16	20	12	20	13	17	10	18	10	18	11	19	19	11	18	10	18	10	17	13	20	12	20	16	13	8	
14			7	12	15	20	7	20	11	18	14	18	10	18	12	12	18	10	18	14	18	11	20	7	20	15	12	7		
12			7	7	11	12	20	12	20	10	18	10	20	11	17	17	11	20	10	18	10	20	12	20	12	11	7	7		
10					7	11	15	20	20	18	10	18	12	18	12	12	18	12	18	10	18	20	20	15	11	7				
8						7	12	16	20	14	20	12	18	12	19	19	12	18	12	20	14	20	16	12	7					
6						7	7	13	16	15	16	15	16	16	12	12	16	16	15	16	15	16	13	7	7					
4								9	10	10	10	10	10	10	13	13	10	10	10	10	10	10	9							
2									7	7	7	8	7	7	7	7	7	7	8	7	7	7								
	1	3	5	7	9	11	13	15	17	19	21	23	25	27	29	31	33	35	37	39	41	43	45	47	49	51	53	55	57	59

Fuel Type			
7=GE14-P10CNAB434-8G7.0/7G6.0-120T-150-T6-3233	(Cycle 13)	15=GE14-P10CNAB430-15GZ-120T-150-T6-4239	(Cycle 15)
8=GE14-P10CNAB416-17GZ-120T-150-T6-3235	(Cycle 13)	16=GE14-P10CNAB430-14GZ-120T-150-T6-4240	(Cycle 15)
9=GE14-P10CNAB417-17GZ-120T-150-T6-3236	(Cycle 13)	17=GE14-P10CNAB418-15GZ-120T-150-T6-4241	(Cycle 15)
10=GE14-P10CNAB434-15GZ-120T-150-T6-4039	(Cycle 14)	18=GE14-P10CNAB419-17GZ-120T-150-T6-4242	(Cycle 15)
11=GE14-P10CNAB422-17GZ-120T-150-T6-4041	(Cycle 14)	19=GE14-P10CNAB418-16GZ-120T-150-T6-4243	(Cycle 15)
12=GE14-P10CNAB412-15GZ-120T-150-T6-4040	(Cycle 14)	20=GE14-P10CNAB422-16GZ-120T-150-T6-4244	(Cycle 15)
13=GE14-P10CNAB422-17GZ-120T-150-T6-4042	(Cycle 14)		
14=GE14-P10CNAB412-14GZ-120T-150-T6-4043	(Cycle 14)		

Figure 2. Previous Cycle Core Loading Diagram

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Figure 3. Figure 4.1 from NEDC-32601P-A

[[

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Figure 4. Figure III.5-1 from NEDC-32601P-A

[[

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Figure 5. Relationship Between MIP and Critical Power Ratio (CPR) Margin

Figure 5. Relationship Between MIP and Critical Power Ratio (CPR) Margin

Table 1. Description of Core

Description	Previous Cycle Off-Rated Power Off-Rated Core Flow Limiting Case	Previous Cycle Rated Power Minimum Core Flow Limiting Case	Previous Cycle Rated Power Rated Core Flow Limiting Case	Previous Cycle Rated Power Increased Core Flow Limiting Case	Current Cycle Off-Rated Power Off-Rated Core Flow Limiting Case	Current Cycle Rated Power Minimum Core Flow Limiting Case	Current Cycle Rated Power Rated Core Flow Limiting Case	Current Cycle Rated Power Increased Core Flow Limiting Case
Number of Bundles in the Core	764				764			
Limiting Point (i.e., Beginning of Cycle (BOC)/Middle of Cycle (MOC)/End of Cycle (EOC))	EOC	EOC	EOC	EOC	EOC	EOC	EOC	EOC
Cycle Exposure at Limiting Point (MWd/STU)	16000	16000	16000	16000	15000	15000	15000	15000
% Rated Core Power	77.6	100.0	100.0	100.0	77.6	100.0	100.0	100.0
% Rated Core Flow	55.0	85.0	100.0	105.0	55.0	85.0	100.0	105.0
Reload Fuel Type	GE14				GNF2			
Latest Reload Batch Fraction, %	44.0				41.9			
Latest Reload Average Batch, Wt% Enrichment	4.21				4.05			
Core Fuel, % GE14 GNF2	 100.0 0.0				 58.1 41.9			
Core Average Wt% Enrichment	4.23				4.16			

Table 2. SLMCPR Calculation Methodologies

Description	Previous Cycle	Current Cycle
Non-power Distribution Uncertainty	NEDC-32601P-A	NEDC-32601P-A
Power Distribution Methodology	NEDC-32694P-A	NEDC-32694P-A
Power Distribution Uncertainty	NEDC-32694P-A	NEDC-32694P-A
Core Monitoring System	3DMONICORE	3DMONICORE
R-Factor Calculation Methodology	NEDC-32505P-A	NEDC-32505P-A

Table 3. Monte Carlo Calculated SLMCPR vs. Estimate

Description	Previous Cycle Off-Rated Power Off-rated Core Flow Limiting Case	Previous Cycle Rated Power Minimum Core Flow Limiting Case	Previous Cycle Rated Power Rated Core Flow Limiting Case	Previous Cycle Rated Power Increased Core Flow Limiting Case	Current Cycle Off-Rated Power Off-rated Core Flow Limiting Case	Current Cycle Rated Power Minimum Core Flow Limiting Case	Current Cycle Rated Power Rated Core Flow Limiting Case	Current Cycle Rated Power Increased Core Flow Limiting Case
[[								
								]]

Table 3. Monte Carlo Calculated SLMCPR vs. Estimate

Description	Previous Cycle Off-Rated Power Off-rated Core Flow Limiting Case	Previous Cycle Rated Power Minimum Core Flow Limiting Case	Previous Cycle Rated Power Rated Core Flow Limiting Case	Previous Cycle Rated Power Increased Core Flow Limiting Case	Current Cycle Off-Rated Power Off-rated Core Flow Limiting Case	Current Cycle Rated Power Minimum Core Flow Limiting Case	Current Cycle Rated Power Rated Core Flow Limiting Case	Current Cycle Rated Power Increased Core Flow Limiting Case
Additional SLMCPR Licensing Conditions	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Requested Change to the Technical Specification SLMCPR	1.090 (TLO) / 1.090 (SLO)				1.150 (TLO)/ 1.150 (SLO)			
[[								
								]]

Table 4. Non-Power Distribution Uncertainties

Description	Nominal (NRC-Approved) Value ± σ (%)	Previous Cycle Off-Rated Power Off-rated Core Flow Limiting Case	Previous Cycle Rated Power Minimum Core Flow Limiting Case	Previous Cycle Rated Power Rated Core Flow Limiting Case	Previous Cycle Rated Power Increased Core Flow Limiting Case	Current Cycle Off-Rated Power Off-Rated Core Flow Limiting Case	Current Cycle Rated Power Minimum Core Flow Limiting Case	Current Cycle Rated Power Rated Core Flow Limiting Case	Current Cycle Rated Power Increased Core Flow Limiting Case
GETAB									
Feedwater Flow Measurement	1.76	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Feedwater Temperature Measurement	0.76	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Reactor Pressure Measurement	0.50	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Core Inlet Temperature Measurement	0.20	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total Core Flow Measurement	6.0 SLO 2.5 TLO	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Channel Flow Area Variation	3.0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Friction Factor Multiplier	10.0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Channel Friction Factor Multiplier	5.0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
NEDC-32601P-A									

Table 4. Non-Power Distribution Uncertainties

Description	Nominal (NRC-Approved) Value ± σ (%)	Previous Cycle Off-Rated Power Off-rated Core Flow Limiting Case	Previous Cycle Rated Power Minimum Core Flow Limiting Case	Previous Cycle Rated Power Rated Core Flow Limiting Case	Previous Cycle Rated Power Increased Core Flow Limiting Case	Current Cycle Off-Rated Power Off-Rated Core Flow Limiting Case	Current Cycle Rated Power Minimum Core Flow Limiting Case	Current Cycle Rated Power Rated Core Flow Limiting Case	Current Cycle Rated Power Increased Core Flow Limiting Case
Feedwater Flow Measurement	[[ ]]	[[ ]]	[[ ]]	[[ ]]	[[ ]]	[[ ]]	[[ ]]	[[ ]]	[[ ]]
Feedwater Temperature Measurement	[[ ]]	[[ ]]	[[ ]]	[[ ]]	[[ ]]	[[ ]]	[[ ]]	[[ ]]	[[ ]]
Reactor Pressure Measurement	[[ ]]	[[ ]]	[[ ]]	[[ ]]	[[ ]]	[[ ]]	[[ ]]	[[ ]]	[[ ]]
Core Inlet Temperature Measurement	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
Total Core Flow Measurement	6.0 SLO 2.5 TLO	6.0 TLO	6.0 TLO	6.0 SLO 2.5 TLO	6.0 SLO 2.5 TLO	6.0 TLO	6.0 TLO	6.0 SLO 2.5 TLO	6.0 SLO 2.5 TLO
Channel Flow Area Variation	[[ ]]	[[ ]]	[[ ]]	[[ ]]	[[ ]]	[[ ]]	[[ ]]	[[ ]]	[[ ]]
Friction Factor Multiplier	[[ ]]	[[ ]]	[[ ]]	[[ ]]	[[ ]]	[[ ]]	[[ ]]	[[ ]]	[[ ]]
Channel Friction Factor Multiplier	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0

Table 5. Power Distribution Uncertainties

Description	Nominal (NRC-Approved) Value ± σ (%)	Previous Cycle Off-Rated Power Off-rated Core Flow Limiting Case	Previous Cycle Rated Power Minimum Core Flow Limiting Case	Previous Cycle Rated Power Rated Core Flow Limiting Case	Previous Cycle Rated Power Increased Core Flow Limiting Case	Current Cycle Off-Rated Power Off-Rated Core Flow Limiting Case	Current Cycle Rated Power Minimum Core Flow Limiting Case	Current Cycle Rated Power Rated Core Flow Limiting Case	Current Cycle Rated Power Increased Core Flow Limiting Case
GETAB/NEDC-32601P-A									
GEXL R-Factor	[[ ]]	[[ ]]	[[ ]]	[[ ]]	[[ ]]	[[ ]]	[[ ]]	[[ ]]	[[ ]]
Random Effective TIP Reading	2.85 SLO 1.2 TLO	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Systematic Effective TIP Reading	8.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
NEDC-32694P-A, 3DMONICORE									
GEXL R-Factor	[[ ]]	[[ ]]	[[ ]]	[[ ]]	[[ ]]	[[ ]]	[[ ]]	[[ ]]	[[ ]]
Random Effective TIP Reading	2.85 SLO 1.2 TLO	2.85 TLO	2.85 TLO	2.85 SLO 1.2 TLO	2.85 SLO 1.2 TLO	2.85 TLO	2.85 TLO	2.85 SLO 1.2 TLO	2.85 SLO 1.2 TLO
TIP Integral	[[ ]]	[[ ]]	[[ ]]	[[ ]]	[[ ]]	[[ ]]	[[ ]]	[[ ]]	[[ ]]
Four Bundle Power Distribution Surrounding TIP Location	[[ ]]	[[ ]]	[[ ]]	[[ ]]	[[ ]]	[[ ]]	[[ ]]	[[ ]]	[[ ]]

Table 5. Power Distribution Uncertainties

Description	Nominal (NRC-Approved) Value ± σ (%)	Previous Cycle Off-Rated Power Off-rated Core Flow Limiting Case	Previous Cycle Rated Power Minimum Core Flow Limiting Case	Previous Cycle Rated Power Rated Core Flow Limiting Case	Previous Cycle Rated Power Increased Core Flow Limiting Case	Current Cycle Off-Rated Power Off-Rated Core Flow Limiting Case	Current Cycle Rated Power Minimum Core Flow Limiting Case	Current Cycle Rated Power Rated Core Flow Limiting Case	Current Cycle Rated Power Increased Core Flow Limiting Case
Contribution to Bundle Power Uncertainty Due to LPRM Update	[[ ]]	[[ ]]	[[ ]]	[[ ]]	[[ ]]	[[ ]]	[[ ]]	[[ ]]	[[ ]]
Contribution to Bundle Power Due to Failed TIP	[[ ]]	[[ ]]	[[ ]]	[[ ]]	[[ ]]	[[ ]]	[[ ]]	[[ ]]	[[ ]]
Contribution to Bundle Power Due to Failed LPRM	[[ ]]	[[ ]]	[[ ]]	[[ ]]	[[ ]]	[[ ]]	[[ ]]	[[ ]]	[[ ]]
Total Uncertainty in Calculated Bundle Power	[[ ]]	[[ ]]	[[ ]]	[[ ]]	[[ ]]	[[ ]]	[[ ]]	[[ ]]	[[ ]]
Uncertainty of TIP Signal Nodal Uncertainty	[[ ]]	[[ ]]	[[ ]]	[[ ]]	[[ ]]	[[ ]]	[[ ]]	[[ ]]	[[ ]]

Table 6. Critical Power Uncertainties

Table 6. Critical Power Uncertainties

Description	Nominal Value ± σ (%)	Previous Cycle Off-Rated Power Off-rated Core Flow Limiting Case	Previous Cycle Rated Power Minimum Core Flow Limiting Case	Previous Cycle Rated Power Rated Core Flow Limiting Case	Previous Cycle Rated Power Increased Core Flow Limiting Case	Current Cycle Off-Rated Power Off-Rated Core Flow Limiting Case	Current Cycle Rated Power Minimum Core Flow Limiting Case	Current Cycle Rated Power Rated Core Flow Limiting Case	Current Cycle Rated Power Increased Core Flow Limiting Case
GETAB									
GE14	[[								
GNF2									]]
NEDC-32694P-A, 3DMONICORE									
GE14	[[								
GNF2									]]