

## **Constellation Nuclear**

**Nine Mile Point  
Nuclear Station**

*A Member of the  
Constellation Energy Group*

November 20, 2001  
NMP2L 2038

U. S. Nuclear Regulatory Commission  
Attn: Document Control Desk  
Washington, DC 20555

RE: Nine Mile Point Unit 2  
Docket No. 50-410  
NPF-69  
TAC No. MB3327

***Subject: Application for Amendment to the Technical Specifications Concerning  
the Safety Limit Minimum Critical Power Ratio***

Gentlemen:

Nine Mile Point Nuclear Station, LLC (NMPNS) hereby transmits an Application for Amendment to Nine Mile Point Unit 2 (NMP2) Operating License NPF-69. Enclosed are proposed changes to the Technical Specifications (TS) set forth in Appendix A to the above mentioned license. Attachment A provides retyped TS pages with marginal markings to show areas of proposed changes. The supporting information and analyses pursuant to 10 CFR 50.92 which demonstrate that the proposed changes do not involve a significant hazards consideration are included as Attachment B. To assist the NRC staff with their review, Attachment C includes hand mark-up copies of the affected current TS pages. NMPNS's determination that the proposed changes meet the criteria for categorical exclusion from performing an environmental assessment is included as Attachment D.

The proposed changes to the TS contained herein revise the Safety Limit Minimum Critical Power Ratio (SLMCPR) values in TS 2.1.1.2 to reflect the results of cycle-specific calculations performed for upcoming NMP2 Operating Cycle 9, using NRC-approved methodology for determining SLMCPR values. Similar TS changes have previously been approved by the NRC for Pilgrim Nuclear Power Station and Edwin I. Hatch Nuclear Plant, Unit 2, in safety evaluations dated May 8, 2001 and October 12, 2001, respectively. In addition, TS 5.6.5.b is revised to delete the second and third listed documents (NEDE-23785-1-PA and NEDO-32465-A). Since NEDE-24011-P-A (the first document listed in TS 5.6.5.b) incorporates by reference the analytical methods described in NEDE-23785-1-PA and NEDO-32465-A, the separate TS references to those two documents are unnecessary.

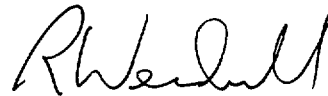
APD1

The information supporting the changes to the SLMCPR values, included as Attachment E, was provided by Global Nuclear Fuel (GNF). Attachment E is considered by GNF to contain proprietary information exempt from disclosure pursuant to 10 CFR 2.790. Therefore, on behalf of GNF, NMPNS hereby makes application to withhold this document from public disclosure in accordance with 10 CFR 2.790(b)(1). An affidavit executed by GNF detailing the reasons for the request to withhold the proprietary information has been included as Attachment F. A non-proprietary version of this document has been included with this letter as Attachment G.

NMPNS requests that this amendment be approved by February 21, 2002 in order to support restart of NMP2 following completion of refueling outage eight (RFO8), currently scheduled to begin in March 2002.

Pursuant to 10 CFR 50.91(b)(1), NMPNS has provided a copy of this license amendment request and the associated analyses regarding no significant hazards consideration to the appropriate state representative.

Very truly yours,



Raymond L. Wenderlich  
Senior Constellation Nuclear Officer  
Responsible for Nine Mile Point

RLW/DEV/cld  
Attachments

cc: Mr. H. J. Miller, NRC Regional Administrator, Region I  
Mr. G. K. Hunegs, NRC Senior Resident Inspector  
Mr. P. S. Tam, Senior Project Manager, NRR (2 copies)  
Mr. J. P. Spath  
NYSERDA  
286 Washington Avenue Ext.  
Albany, NY 12203-6399  
Records Management

UNITED STATES NUCLEAR REGULATORY COMMISSION

In the Matter of

Nine Mile Point Nuclear Station, LLC

Nine Mile Point Unit 2

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Docket No. 50-410

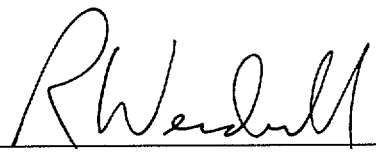
APPLICATION FOR AMENDMENT TO OPERATING LICENSE

Pursuant to Section 50.90 of the Regulations of the Nuclear Regulatory Commission, Nine Mile Point Nuclear Station, LLC (NMPNS), holder of Facility Operating License No. NPF-69, hereby requests an amendment to the Technical Specifications (TS) set forth in Appendix A to the operating license. These changes revise the Safety Limit Minimum Critical Power Ratio (SLMCPR) values in TS 2.1.1.2 to reflect the results of cycle-specific calculations performed for Nine Mile Point Unit 2, using NRC-approved methodology for determining SLMCPR values. In addition, TS 5.6.5.b is revised to delete the second and third listed documents (NEDE-23785-1-PA and NEDO-32465-A). Since NEDE-24011-P-A (the first document listed in TS 5.6.5.b) incorporates by reference the analytical methods described in NEDE-23785-1-PA and NEDO-32465-A, the separate TS references to those two documents are unnecessary. The proposed changes have been reviewed in accordance with the Quality Assurance Program Topical Report.

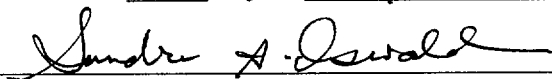
The proposed changes will not authorize any change in the type of effluents or in the authorized power level of the facility. Supporting information and analyses which demonstrate that the proposed changes involve no significant hazards consideration pursuant to 10 CFR 50.92 are included as Attachment B.

WHEREFORE, Applicant respectfully requests that Appendix A to Facility Operating License No. NPF-69 be amended in the form attached hereto as Attachment A.

NINE MILE POINT NUCLEAR STATION, LLC

By   
Raymond L. Wenderlich  
Senior Constellation Nuclear Officer  
Responsible for Nine Mile Point

Subscribed and sworn to before  
me on this 20<sup>th</sup> day of Nov., 2001



NOTARY PUBLIC

SANDRA A. OSWALD  
Notary Public, State of New York  
No. 01OS6032276  
Qualified in Oswego County  
Commission Expires 10/25/05

**ATTACHMENT A**  
**NINE MILE POINT NUCLEAR STATION, LLC**  
**LICENSE NO. NPF-69**  
**DOCKET NO. 50-410**

**Proposed Changes to Technical Specifications**

Replace the existing Technical Specification (TS) pages listed below with the attached revised pages. The revised pages have been retyped in their entirety, with marginal markings (revision bars) to indicate changes to the text.

<u>Remove</u>	<u>Insert</u>
2.0-1	2.0-1
5.6-3	5.6-3

## 2.0 SAFETY LIMITS (SLs)

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### 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  $\leq 25\%$  RTP.

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

MCPR shall be  $\geq 1.06$  for two recirculation loop operation or  $\geq 1.07$  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  $\leq 1325$  psig.

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### 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.

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5.6 Reporting Requirements

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5.6.5 CORE OPERATING LIMITS REPORT (COLR) (continued)

1. The APLHGR for Specification 3.2.1.
  2. The MCPR for Specification 3.2.2.
  3. The LHGR for Specification 3.2.3.
  4. Reactor Protection System Instrumentation Setpoint for the OPRM – Upscale Function Allowable Value for Specification 3.3.1.1.
  5. Control Rod Block Instrumentation Setpoint for the Rod Block Monitor – Upscale Function Allowable Value for Specification 3.3.2.1.
- b. The analytical methods used to determine the core operating limits shall be those previously reviewed and approved by the NRC, specifically those described in the following documents:
1. NEDE-24011-P-A-US, "General Electric Standard Application for Reactor Fuel," U.S. Supplement, (NRC approved version specified in the COLR).
- c. The core operating limits shall be determined such that all applicable limits (e.g., fuel thermal mechanical limits, core thermal hydraulic limits, Emergency Core Cooling Systems (ECCS) limits, nuclear limits such as SDM, transient analysis limits, and accident analysis limits) of the safety analysis are met.
- d. The COLR, including any midcycle revisions or supplements, shall be provided upon issuance for each reload cycle to the NRC.

(continued)

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**ATTACHMENT B**  
**NINE MILE POINT NUCLEAR STATION, LLC**  
**LICENSE NO. NPF-69**  
**DOCKET NO. 50-410**

**Supporting Information and No Significant Hazards Consideration Analysis**

**INTRODUCTION**

The current required Safety Limit Minimum Critical Power Ratio (SLMCPR) values contained in Section 2.1.1.2 of the Nine Mile Point Unit 2 (NMP2) Technical Specifications (TS) are 1.09 for two recirculation loop operation and 1.10 for single recirculation loop operation. Cycle-specific calculations performed by Global Nuclear Fuel (GNF) for upcoming NMP2 Cycle 9 have resulted in revised SLMCPR values of 1.06 for two recirculation loop operation and 1.07 for single recirculation loop operation. The proposed changes incorporate these calculated SLMCPR values into NMP2 TS 2.1.1.2.

In addition, TS 5.6.5.b lists the analytical methods used to determine the core operating limits. The second document listed is NEDE-23785-1-PA, "The GESTR-LOCA and SAFER Models for the Evaluation of the Loss-of-Coolant Accident, Volume III, SAFER/GESTR Application Methodology." The third document listed is NEDO-32465-A, "Reactor Stability Detect and Suppress Solutions Licensing Basis Methodology for Reload Applications." The proposed change deletes the references to these two documents. Since NEDE-24011-P-A (the first document listed in TS 5.6.5.b) incorporates by reference the analytical methods described in NEDE-23785-1-PA and NEDO-32465-A, the separate TS references to those two documents are unnecessary.

**EVALUATION**

The proposed changes involve revising the SLMCPR values contained in NMP2 TS 2.1.1.2 to reflect the results of the plant-specific evaluation performed by GNF. The GNF calculations of the plant-specific SLMCPR values for NMP2 are based on the NRC approved methods in Amendment 25 to NEDE-24011-P-A, "General Electric Standard Application for Reactor Fuel (GESTAR II)," and several other NRC approved GE documents that are incorporated by reference into GESTAR II. These documents are listed in Attachments E and G. The NRC acceptance of these cycle-specific methods for determining SLMCPR values was documented in a safety evaluation dated March 11, 1999. The analysis methodology incorporates plant and cycle-specific parameters that include: 1) the expected reference loading pattern; 2) conservative variations of projected control blade patterns; 3) the actual bundle parameters; 4) the full cycle exposure range; and 5) reduced power distribution uncertainties associated with the process computer system.

The fuel cladding is one of the principal barriers to the release of radioactive materials to the environment. The SLMCPR is applied to ensure fuel cladding integrity is not lost due to overheating during normal plant operation and anticipated transients. The SLMCPR is set such that no mechanistic fuel damage is calculated to occur if the limit is not violated. Since the parameters that result in fuel damage are not directly observable during reactor operation, the thermal and hydraulic conditions resulting in a departure from nucleate boiling have been used to mark the beginning of the region where fuel damage could occur. Although it is recognized that a departure from nucleate boiling would not necessarily result in damage to BWR fuel rods, the critical power at which boiling transition is calculated to occur has been adopted as a convenient limit. However, the uncertainties in monitoring the core operating state and in the procedures used to calculate the critical power result in an uncertainty in the value of the critical power. Therefore, the SLMCPR is defined as the critical power ratio in the limiting fuel assembly for which more than 99.9 percent of the fuel rods in the core are expected to avoid boiling transition considering the power distribution within the core and all uncertainties.

The GNF evaluation has concluded that the calculated SLMCPR values of 1.06 for two recirculation loop operation and 1.07 for single recirculation loop operation are appropriate for upcoming Cycle 9 operation. Factors contributing to the decrease in the SLMCPR values from their current TS values are discussed in Attachments E and G.

The deletion of the second and third listed documents (NEDE-23785-1-PA and NEDO-32465-A) from TS 5.6.5.b is an administrative change only. NEDE-24011-P-A (the first document listed in TS 5.6.5.b) incorporates by reference the analytical methods described in NEDE-23785-1-PA and NEDO-32465-A. NRC approved analytical methods continue to be used to determine core operating limits.

## **CONCLUSION**

A cycle-specific SLMCPR calculation has been performed for NMP2 using NRC-approved methods and procedures. The revised SLMCPR values assure that the fuel licensing acceptance criteria are met. Based on the above evaluation, Nine Mile Point Nuclear Station, LLC (NMPNS) believes there is reasonable assurance that the proposed TS changes will not adversely affect the health and safety of the public and will not be inimical to the common defense and security.

## **NO SIGNIFICANT HAZARDS CONSIDERATION ANALYSIS**

10 CFR 50.91 requires that at the time a licensee requests an amendment, it must provide to the Commission its analysis using the standards in 10 CFR 50.92 concerning the issue of no significant hazards consideration. According to 10 CFR 50.92(c), a proposed amendment to an operating license involves no significant hazards consideration if operation of the facility in accordance with the proposed amendment would not:

1. Involve a significant increase in the probability or consequences of an accident previously evaluated; or



2. Create the possibility of a new or different kind of accident from any accident previously evaluated; or
3. Involve a significant reduction in a margin of safety.

NMPNS has evaluated this proposed amendment pursuant to 10 CFR 50.91 and has determined that it involves no significant hazards consideration.

The following analysis has been performed.

**The operation of Nine Mile Point Unit 2, in accordance with the proposed amendment, will not involve a significant increase in the probability or consequences of an accident previously evaluated.**

The derivation of the revised Safety Limit Minimum Critical Power Ratio (SLMCPR) values for Nine Mile Point Unit 2 (NMP2) Cycle 9 for incorporation into the Technical Specifications (TS) and their use to determine cycle-specific thermal limits has been performed using the NRC-approved methods and procedures in NEDE-24011-P-A, "General Electric Standard Application for Reactor Fuel" (GESTAR II). The analysis methodology incorporates cycle-specific parameters and reduced power distribution uncertainties in the determination of the SLMCPR values. These calculations do not change the method of operating the plant and have no effect on the probability of an accident initiating event or transient.

The basis of the Minimum Critical Power Ratio Safety Limit is to ensure no mechanistic fuel damage is calculated to occur if the limit is not violated. The new SLMCPR values preserve the existing margin to transition boiling and the probability of fuel damage is not increased. The deletion of listed documents that are already incorporated by reference into GESTAR II is administrative only. Therefore, the proposed changes do not involve a significant increase in the probability or consequences of an accident previously evaluated.

**The operation of Nine Mile Point Unit 2, in accordance with the proposed amendment, will not create the possibility of a new or different kind of accident from any accident previously evaluated.**

The new SLMCPR values for the NMP2 Cycle 9 core reload have been calculated in accordance with the methods and procedures described in GESTAR II. These methods have been reviewed and approved by the NRC. The deletion of listed documents that are already incorporated by reference into GESTAR II is administrative only. The changes do not involve any new method for operating the facility and do not involve any facility modifications. No new initiating events or transients result from these changes. Therefore, the proposed TS changes do not create the possibility of a new or different kind of accident from any accident previously evaluated.

**The operation of Nine Mile Point Unit 2, in accordance with the proposed amendment, will not involve a significant reduction in a margin of safety.**

The margin of safety as defined in the TS bases will remain the same. The new, cycle-specific SLMCPR values are calculated using NRC-approved methods and procedures that are in accordance with the current fuel design and licensing criteria. The SLMCPR values remain high enough to ensure that greater than 99.9% of all fuel rods in the core are expected to avoid transition boiling if the limits are not violated, thereby preserving the fuel cladding integrity. The deletion of listed documents that are already incorporated by reference into GESTAR II is administrative only. Therefore, the proposed TS changes do not involve a significant reduction in the margin of safety.

**ATTACHMENT C**  
**NINE MILE POINT NUCLEAR STATION, LLC**  
**LICENSE NO. NPF-69**  
**DOCKET NO. 50-410**

**“Marked-up” Copy of Proposed Changes to Current Technical Specifications and Bases**

The current versions of Nine Mile Point Unit 2 Technical Specification pages 2.0-1 and 5.6-3 have been marked-up by hand to reflect the proposed changes.

## 2.0 SAFETY LIMITS (SLs)

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### 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  $\leq$  25% RTP.

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

MCPR shall be  $\geq$  ~~1.09~~ <sup>1.06</sup> for two recirculation loop operation or  $\geq$  ~~1.10~~ <sup>1.07</sup> 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  $\leq$  1325 psig.

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### 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

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## 5.6 Reporting Requirements

### 5.6.5 CORE OPERATING LIMITS REPORT (COLR) (continued)

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  2. The MCPR for Specification 3.2.2.
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- b. The analytical methods used to determine the core operating limits shall be those previously reviewed and approved by the NRC, specifically those described in the following documents:
1. NEDE-24011-P-A-US, "General Electric Standard Application for Reactor Fuel," U.S. Supplement, (NRC approved version specified in the COLR).
  2. NEDE-23785-1-PA, "The GESTR-LOCA and SAFER Models for the Evaluation of the Loss-of-Coolant Accident, Volume III, SAFER/GESTR Application Methodology," (NRC approved version specified in the COLR).
  3. NEDO-32465-A, "Reactor Stability Detect and Suppress Solutions Licensing Basis Methodology for Reload Applications," August 1996.
- c. The core operating limits shall be determined such that all applicable limits (e.g., fuel thermal mechanical limits, core thermal hydraulic limits, Emergency Core Cooling Systems (ECCS) limits, nuclear limits such as SDM, transient analysis limits, and accident analysis limits) of the safety analysis are met.
- d. The COLR, including any midcycle revisions or supplements, shall be provided upon issuance for each reload cycle to the NRC.

(continued)

**ATTACHMENT D**

**NINE MILE POINT NUCLEAR STATION, LLC**

**LICENSE NO. NPF-69**

**DOCKET NO. 50-410**

**Eligibility for Categorical Exclusion from Performing an Environmental Assessment**

10 CFR 51.22 provides criteria for, and identification of, licensing and regulatory actions eligible for exclusion from performing an environmental assessment. Nine Mile Point Nuclear Station, LLC has reviewed the proposed amendment and determined that it does not involve a significant hazards consideration, and there will be no significant change in the types or a significant increase in the amounts of any effluents that may be released offsite; nor will there be any significant increase in individual or cumulative occupational radiation exposure. Therefore, the proposed amendment meets the eligibility criteria for categorical exclusion set forth in 10 CFR 51.22(c)(9) and, pursuant to 10 CFR 51.22(b), no environmental impact statement or environmental assessment is required to be prepared in connection with this license amendment application.



**Global Nuclear Fuel**

A Joint Venture of GE, Toshiba, & Hitachi

**Affidavit**

**I, Glen A. Watford, being duly sworn, depose and state as follows:**

- (1) I am Manager, Fuel Engineering Services, Global Nuclear Fuel – Americas, L.L.C. (“GNF-A”) and have been delegated the function of reviewing the information described in paragraph (2) which is sought to be withheld, and have been authorized to apply for its withholding.
- (2) The information sought to be withheld is contained in the attachment, “Additional Information Regarding the Cycle Specific SLMCPR for Nine Mile Point-2 Cycle 9,” October 23, 2001.
- (3) In making this application for withholding of proprietary information of which it is the owner or licensee, GNF-A relies upon the exemption from disclosure set forth in the Freedom of Information Act (“FOIA”), 5 USC Sec. 552(b)(4), and the Trade Secrets Act, 18 USC Sec. 1905, and NRC regulations 10 CFR 9.17(a)(4) and 2.790(a)(4) for “trade secrets and commercial or financial information obtained from a person and privileged or confidential” (Exemption 4). The material for which exemption from disclosure is here sought is all “confidential commercial information,” and some portions also qualify under the narrower definition of “trade secret,” within the meanings assigned to those terms for purposes of FOIA Exemption 4 in, respectively, Critical Mass Energy Project v. Nuclear Regulatory Commission, 975F2d871 (DC Cir. 1992), and Public Citizen Health Research Group v. FDA, 704F2d1280 (DC Cir. 1983).
- (4) Some examples of categories of information which fit into the definition of proprietary information are:
  - a. Information that discloses a process, method, or apparatus, including supporting data and analyses, where prevention of its use by GNF-A’s competitors without license from GNF-A constitutes a competitive economic advantage over other companies;
  - b. Information which, if used by a competitor, would reduce his expenditure of resources or improve his competitive position in the design, manufacture, shipment, installation, assurance of quality, or licensing of a similar product;
  - c. Information which reveals cost or price information, production capacities, budget levels, or commercial strategies of GNF-A, its customers, or its suppliers;
  - d. Information which reveals aspects of past, present, or future GNF-A customer-funded development plans and programs, of potential commercial value to GNF-A;
  - e. Information which discloses patentable subject matter for which it may be desirable to obtain patent protection.

The information sought to be withheld is considered to be proprietary for the reasons set forth in paragraphs (4)a. and (4)b., above.

- (5) The information sought to be withheld is being submitted to NRC in confidence. The information is of a sort customarily held in confidence by GNF-A, and is in fact so held. Its initial designation as proprietary information, and the subsequent steps taken to prevent its unauthorized disclosure, are as set forth in (6) and (7) following. The information sought to be withheld has, to the best of my knowledge and belief, consistently been held in confidence by GNF-A, no public disclosure

## Affidavit

has been made, and it is not available in public sources. All disclosures to third parties including any required transmittals to NRC, have been made, or must be made, pursuant to regulatory provisions or proprietary agreements which provide for maintenance of the information in confidence.

- (6) Initial approval of proprietary treatment of a document is made by the manager of the originating component, the person most likely to be acquainted with the value and sensitivity of the information in relation to industry knowledge, or subject to the terms under which it was licensed to GNF-A. Access to such documents within GNF-A is limited on a "need to know" basis.
- (7) The procedure for approval of external release of such a document typically requires review by the staff manager, project manager, principal scientist or other equivalent authority, by the manager of the cognizant marketing function (or his delegate), and by the Legal Operation, for technical content, competitive effect, and determination of the accuracy of the proprietary designation. Disclosures outside GNF-A are limited to regulatory bodies, customers, and potential customers, and their agents, suppliers, and licensees, and others with a legitimate need for the information, and then only in accordance with appropriate regulatory provisions or proprietary agreements.
- (8) The information identified in paragraph (2) is classified as proprietary because it contains details of GNF-A's fuel design and licensing methodology.

The development of the methods used in these analyses, along with the testing, development and approval of the supporting methodology was achieved at a significant cost, on the order of several million dollars, to GNF-A or its licensor.

- (9) Public disclosure of the information sought to be withheld is likely to cause substantial harm to GNF-A's competitive position and foreclose or reduce the availability of profit-making opportunities. The fuel design and licensing methodology is part of GNF-A's comprehensive BWR safety and technology base, and its commercial value extends beyond the original development cost. The value of the technology base goes beyond the extensive physical database and analytical methodology and includes development of the expertise to determine and apply the appropriate evaluation process. In addition, the technology base includes the value derived from providing analyses done with NRC-approved methods.

The research, development, engineering, analytical, and NRC review costs comprise a substantial investment of time and money by GNF-A or its licensor.

The precise value of the expertise to devise an evaluation process and apply the correct analytical methodology is difficult to quantify, but it clearly is substantial.

GNF-A's competitive advantage will be lost if its competitors are able to use the results of the GNF-A experience to normalize or verify their own process or if they are able to claim an equivalent understanding by demonstrating that they can arrive at the same or similar conclusions.

The value of this information to GNF-A would be lost if the information were disclosed to the public. Making such information available to competitors without their having been required to undertake a similar expenditure of resources would unfairly provide competitors with a windfall, and deprive GNF-A of the opportunity to exercise its competitive advantage to seek an adequate return on its large investment in developing and obtaining these very valuable analytical tools.



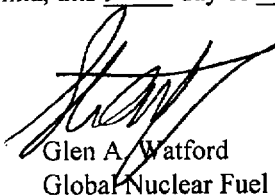
Affidavit

State of North Carolina     )  
County of New Hanover    )     SS:

Glen A. Watford, being duly sworn, deposes and says:

That he has read the foregoing affidavit and the matters stated therein are true and correct to the best of his knowledge, information, and belief.

Executed at Wilmington, North Carolina, this 24<sup>th</sup> day of October, 2001

  
Glen A. Watford  
Global Nuclear Fuel – Americas, LLC

Subscribed and sworn before me this 24<sup>th</sup> day of October, 2001



Notary Public, State of North Carolina

My Commission Expires Feb. 6, 2006

**ATTACHMENT G**

**NINE MILE POINT NUCLEAR STATION, LLC**

**LICENSE NO. NPF-69**

**DOCKET NO. 50-410**

**Attachment to Global Nuclear Fuel Letter No. 262-01-037 dated October 23, 2001,**  
**titled "Additional Information Regarding the Cycle Specific SLMCPR**  
**for Nine Mile Point-2 Cycle 9"**

**Non-Proprietary Version**

## References

- [1] Letter, Frank Akstulewicz (NRC) to Glen A. Watford (GE), "Acceptance for Referencing of Licensing Topical Reports NEDC-32601P, *Methodology and Uncertainties for Safety Limit MCPR Evaluations*; NEDC-32694P, *Power Distribution Uncertainties for Safety Limit MCPR Evaluation*; and Amendment 25 to NEDE-24011-P-A on Cycle Specific Safety Limit MCPR," (TAC Nos. M97490, M99069 and M97491), March 11, 1999.
- [2] Letter, Thomas H. Essig (NRC) to Glen A. Watford (GE), "Acceptance for Referencing of Licensing Topical Report NEDC-32505P, Revision 1, *R-Factor Calculation Method for GE11, GE12 and GE13 Fuel*," (TAC Nos. M99070 and M95081), January 11, 1999.
- [3] *General Electric BWR Thermal Analysis Basis (GETAB): Data, Correlation and Design Application*, NEDO-10958-A, January 1977.

## Comparison of Nine Mile Point-2 Cycle 9 SLMCPR Value

Table 1 summarizes the relevant input parameters and results of the safety limit MCPR (SLMCPR) determination for the Nine Mile Point-2 Cycle 9 and Cycle 8 cores. Table 2 provides a more detailed presentation of the bases and results for the Cycle 9 and Cycle 8 analyses. The SLMCPR evaluations were performed using NRC approved methods and uncertainties<sup>[1]</sup>. These evaluations yield different calculated SLMCPR values because different inputs were used. The quantities that have been shown to have some impact on the determination of the SLMCPR are provided.

In comparing the Nine Mile Point-2 Cycle 9 and Cycle 8 SLMCPR values it is important to note the impact of the differences in the core and bundle designs. These differences are summarized in Table 1. The GETAB and reduced power distribution uncertainty columns for Cycle 8 are both provided for comparison to the Cycle 9 reduced power distribution uncertainty column.

In general, the calculated safety limit is dominated by two key parameters: (1) flatness of the core bundle-by-bundle MCPR distributions and (2) flatness of the bundle pin-by-pin power/R-factor distributions. Greater flatness in either parameter yields more rods susceptible to boiling transition and thus a higher calculated SLMCPR.

[[            ]]

The uncontrolled bundle pin-by-pin power distributions were compared between the Nine Mile Point-2 Cycle 9 bundles and the Cycle 8 bundles. Pin-by-pin power distributions are characterized in terms of R-factors using the NRC approved methodology<sup>[2]</sup>. For the Nine Mile Point-2 Cycle 9 limiting case analyzed at PHE, [[            ]] the Nine Mile Point-2 Cycle 9 bundles are more peaked than the bundles used for the Cycle 8 SLMCPR analysis.

With a flatter core MCPR distribution in Cycle 9 than in Cycle 8, but a more peaked bundle R-factor distribution in Cycle 9 relative to the Cycle 8 bundles, it would be expected that the Cycle 9 SLMCPR result would be equal to or slightly greater than the Cycle 8 result. Table 1 shows that when using the same uncertainties both SLMCPR values are the same. Table 2, which shows these same values to greater precision, confirms that the Cycle 9 result is slightly greater than the Cycle 8 value.

As indicated in Table 1, the NRC approved<sup>(1)</sup> reduced power distribution uncertainties have been assumed for the Nine Mile Point-2 Cycle 9 analyses. For the Cycle 8 case, the standard GETAB and the reduced power distribution uncertainties were used. Use of the reduced power distribution uncertainties results in a reduction of the SLMCPR by approximately 0.03.

### Comparison of the GETAB and Reduced Uncertainties

The power distribution and other uncertainties that are the bases for the proposed Tech Spec safety limit for Nine Mile Point-2 Cycle 9 are identified in Table 2. Column 2a of Table 2 shows the power distribution and other uncertainties that are the bases for the current Tech Spec safety limit for Cycle 8. The revised bases to support the proposed Tech Spec change in safety limit for Cycle 9 are identified in column 3 of Table 2. The revised bases for Cycle 8 are provided for comparison purposes in column 2b. By comparing the values from column 2b for Cycle 8 and column 3 for Cycle 9, one may see that the calculated SLMCPR for Cycle 9 is only very slightly higher [[ ]] than the value for Cycle 8 when using the same GETAB model and uncertainties for both calculations.

The revised model and reduced power distribution uncertainties affect the calculated SLMCPR for Nine Mile Point-2 Cycle 8 as indicated in Table 2. Bases that have not changed are not reported in either table except where it is important to indicate that the bases have not changed. For these exceptions, the impact on the SLMPCR is indicated as "None" in the rightmost column of Table 2. For the other items where a change in basis is indicated, the calculated impact that each item has on the calculated SLMCPR is indicated.

The impacts from the changes in bases have been grouped into three categories. In each category the shaded cells contain values that sum to produce the total impact for that category indicated in the cell immediately below the shaded cells.

In Section 1 of Table 2 the impact of using the "revised uncertainties not related to power distribution" is indicated as "None" since the same revised uncertainties were used for both the GETAB calculation (Column 2a) and the revised calculation (Column 2b).

The largest change in the calculated SLMCPR is the reduction that is due to use of the NRC-approved revised power distribution model and its associated reduced uncertainties as described in NEDC-32694P-A. For Nine Mile Point Cycle 8 the calculated SLMCPR was reduced by [[ ]] as indicated in Section 2 of Table 2.

In Section 3 of Table 2 the "secondary impact on SLMCPR because reduced SLMCPR causes a lower OLMCPR" is indicated as [[ ]] since the GETAB calculation and the revised calculation use different limiting rod patterns, [[ ]]

The total impact is that the SLMCPR as calculated using NRC-approved methods, inputs and procedures decreases by [[ ]]. Similar calculated reductions are seen for the SLO SLMCPR. This amount of improvement is consistent with the expected improvements as presented to the NRC in Table 4.3 of NEDC-32694P-A. Of this improvement, about [[ ]] is attributed to the reduced uncertainties themselves and the remaining [[ ]] is attributed to the methodology improvements described in NEDC-32694P-A.

Reduction in the Tech Spec SLMCPRs by these calculated amounts is warranted since the old GETAB value is overly conservative. The excessive conservatism in the GETAB model and inputs is primarily due to the higher [[ ]] uncertainty [[ ]] These limitations are not applicable to the 3D-MONICORE (3DM) monitoring system. The revised power distribution model and reduced uncertainties associated with 3DM have been justified, reviewed and approved by the NRC (reference NEDC-32601P-A and NEDC-32694P-A). The conservatism that remains even when applying the revised model and reduced uncertainties to calculate a lower SLMCPR was documented as part of the NRC review and approval. It was noted on page A-24 of NEDC-32601P-A [[ ]]

### Summary

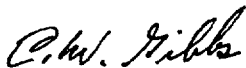
[[ ]] have been used to compare quantities that impact the calculated SLMCPR value. Based on these comparisons, the conclusion is reached that the Nine Mile Point-2 Cycle 9 core/cycle has a flatter core MCPR distribution [[ ]] than what was used to perform the Cycle 8 SLMCPR evaluation; and the Nine Mile Point-2 Cycle 9 core/cycle has more peaked in-bundle power distributions [[ ]] than what was used to perform the Cycle 8 SLMCPR evaluation.

The calculated 1.06 Monte Carlo SLMCPR for Nine Mile Point-2 Cycle 9 is consistent with what one would expect [[ ]] the 1.06 SLMCPR value is appropriate when the approved methodology and the reduced uncertainties given in NEDC-32601P-A and NEDC-32694P-A are used.

Based on all of the facts, observations and arguments presented above, it is concluded that the calculated SLMCPR value of 1.06 for the Nine Mile Point-2 Cycle 9 core is appropriate. It is reasonable that this value is smaller than the 1.09 value calculated for the previous cycle.

For single loop operations (SLO) the calculated safety limit MCPR for the limiting case is 1.07 as determined by specific calculations for Nine Mile Point-2 Cycle 9.

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Table 1

## Comparison of the Nine Mile Point-2 Cycle 9 and Cycle 8 SLMCPR

QUANTITY, DESCRIPTION	Nine Mile Point-2 Cycle 8		Nine Mile Point-2 Cycle 9
Number of Bundles in Core	764	764	764
Limiting Cycle Exposure Point	EOC-1.0K	EOC-1.0K	PHE
Cycle Exposure at Limiting Point [MWd/STU]	14,310	14,310	10,000
Reload Fuel Type	GE11	GE11	GE11
Latest Reload Batch Fraction [%]	32.5%	32.5%	37.2%
Latest Reload Average Batch Weight % Enrichment	4.07%	4.07%	4.06%
Batch Fraction for GE11	100.0%	100.0%	100.0%
Core Average Weight % Enrichment	3.99%	3.99%	4.09%
Core MCPR (for limiting rod pattern)	1.32	1.31	1.27
[[			]]
[[			]]
Power distribution uncertainty	GETAB NEDO-10958-A	Reduced NEDC-32694P-A	Reduced NEDC-32694P-A
Non-power distribution uncertainty	Revised NEDC-32601P-A	Revised NEDC-32601P-A	Revised NEDC-32601P-A
<b>Calculated Safety Limit MCPR</b>	<b>1.09</b>	<b>1.06</b>	<b>1.06</b>

Table 2

## Nine Mile Point-2 Cycles 8 and 9 SLMCPR Results Assessment

1	2a	2b	3	4
Quantity	Cycle 8 GETAB Value	Cycle 8 Revised Bases	Cycle 9 Revised Bases	Impact on SLMCPR for Cycle 8 (col. 2b-2a)
Tech Spec	Current	Proposed	Proposed	[[ ]]
<b>1. Impact of Revised Uncertainties Not Related to Power Distribution</b>				
Reference Document	NEDC-32601P-A August 1999	NEDC-32601P-A August 1999	NEDC-32601P-A August 1999	Approved by NRC
Feedwater flow uncertainty	[[ ]]		]]	None
Reactor pressure uncertainty	[[ ]]		]]	None
Channel flow area uncertainty	[[ ]]		]]	None
Friction multiplier uncertainty	[[ ]]		]]	None
				[[ ]]
<b>2. Impact of Reduced Power Distribution Uncertainties and Revised Modeling</b>				
Reference Document	NEDO-10958-A January 1977	NEDC-32694P-A August 1999	NEDC-32694P-A August 1999	Both approved by NRC
R-factor uncertainty	[[ ]]		]]	None
Critical power uncertainty	[[ ]]		]]	None
TIP random uncertainty component	[[ ]]		]]	None
Monitoring adaptive mode supported by Safety Limit analysis	Absolute or Shape	Shape only	Shape only	Both approved by NRC
Effective total bundle power uncertainty	[[ ]]		]]	Part of overall TIPSYS
Effective non-random TIPSYS	[[ ]]		]]	Part of overall TIPSYS
Effective overall TIPSYS uncertainty as modeled	[[ ]]		]]	[[ ]]
<b>3. Secondary Impact on SLMCPR because Reduced SLMCPR causes a Lower OLMCPR</b>				
Target OLMCPR	1.32	1.29	1.32	See below
[[ ]]			]]	[[ ]]
[[ ]]			]]	[[ ]]
[[ ]]				[[ ]]
<b>Total Impact on Tech Spec SLMCPR and SLO SLMCPR</b>				
Calculated SLMCPR	[[ ]]			]]
Calculated SLO SLMCPR	[[ ]]			]]
Tech Spec SLMCPR	1.09	[[ ]]	1.06	[[ ]]
Tech Spec SLO SLMCPR	1.10	[[ ]]	1.07	[[ ]]