Progress Energy

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MAR 19 2004

SERIAL: BSEP 04-0043
TSC-2003-07

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

Subject: Brunswick Steam Electric Plant, Unit No. 1
Docket No. 50-325/License No. DPR-71
Response to Request for Additional Information
Technical Specification 2.1.1.2, Reactor Core Minimum Critical Power Ratio Safety Limit and Revision to References in Technical Specification 5.6.5, Core Operating Limits Report (COLR)
(NRC TAC No. MC1249)

References:

1. Letter from John S. Keenan to U.S. Nuclear Regulatory Commission (Serial: BSEP 03-0148), "Request for License Amendment - Technical Specification 2.1.1.2, Reactor Core Minimum Critical Power Ratio Safety Limit and Revision to References in Technical Specification 5.6.5, Core Operating Limits Report (COLR)," dated October 31, 2003

2. Letter from William G. Noll to U.S. Nuclear Regulatory Commission (Serial: BSEP 04-0035), "Response to Request for Additional Information, Technical Specification 2.1.1.2, Reactor Core Minimum Critical Power Ratio Safety Limit and Revision to References in Technical Specification 5.6.5, Core Operating Limits Report (COLR)," dated March 4, 2004

3. Letter from William G. Noll to U.S. Nuclear Regulatory Commission (Serial: BSEP 04-0039), "Response to Request for Additional Information, Technical Specification 2.1.1.2, Reactor Core Minimum Critical Power Ratio Safety Limit and Revision to References in Technical Specification 5.6.5, Core Operating Limits Report (COLR)," dated March 12, 2004

Ladies and Gentlemen:

On October 31, 2003, Carolina Power & Light Company, now doing business as Progress Energy Carolinas, Inc. (PEC) requested a license amendment for the Brunswick Steam Electric Plant (BSEP), Unit No. 1. The proposed license amendment would: (1) revise the

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Technical Specification (TS) 2.1.1.2 minimum critical power ratio (MCPR) safety limit value for both two and single recirculation loop operation and (2) add topical report NEDE-32906P-A, "TRACG Application for Anticipated Operational Occurrences (AOO) Transient Analyses," to the TS 5.6.5 list of approved methodologies used to determine the core operating limits.

On March 12, 2004, the NRC provided an electronic request for additional information, designated as RAI Question 7. Enclosure 1 provides the response to RAI Question 7. The available core follow data and the analysis results, summarized in Enclosure 1, demonstrate that the General Electric GETAB uncertainties used in the BSEP Unit 1 Cycle 15 SLMCPR analysis continue to bound the corresponding POWERPLEX II core monitoring system uncertainties.

The response to RAI Question 7 contains information that Global Nuclear Fuels - Americas, LLC (GNF-A) and Framatome ANP (FANP) considers to be proprietary as defined in 10 CFR 2.390. GNF-A and FANP, as owners of the proprietary information, have executed the affidavits provided in Enclosures 2 and 3, which identify that the enclosed proprietary information has been handled and classified as proprietary, is customarily held in confidence, and has been withheld from public disclosure. GNF-A and FANP request that the enclosed proprietary information be withheld from public disclosure in accordance with the provisions of 10 CFR 2.390 and 9.17. A non-proprietary (i.e., redacted) version of the response is provided in Enclosure 4.

PEC is providing the State of North Carolina a copy of this letter.

Please refer any questions regarding this submittal to Mr. Edward T. O'Neil, Manager - Support Services, at (910) 457-3512.

Sincerely,

Cornelius J. Gannon

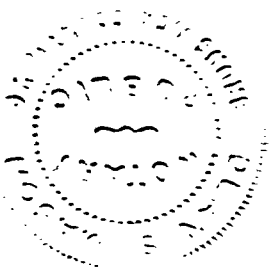
WRM/wrm

Enclosures:

1. Response to Request for Additional Information **(Proprietary Information)**
2. Global Nuclear Fuel - Americas, LLC Affidavit of Proprietary Information
3. Framatome ANP Affidavit of Proprietary Information
4. Response to Request for Additional Information **(Non-proprietary Version)**

Cornelius J. Gannon, having been first duly sworn, did depose and say that the information contained herein is true and correct to the best of his information, knowledge and belief; and the sources of his information are officers, employees, and agents of Carolina Power & Light Company.

Dean S. Mason
Notary (Seal)



My commission expires: Aug. 29, 2004

cc (with all enclosures):

U. S. Nuclear Regulatory Commission, Region II
ATTN: Mr. Luis A. Reyes, Regional Administrator
Sam Nunn Atlanta Federal Center
61 Forsyth Street, SW, Suite 23T85
Atlanta, GA 30303-8931

U. S. Nuclear Regulatory Commission
ATTN: Mr. Eugene M. DiPaolo, NRC Senior Resident Inspector
8470 River Road
Southport, NC 28461-8869

U. S. Nuclear Regulatory Commission **(Electronic Copy Only)**
ATTN: Ms. Brenda L. Mozafari (Mail Stop OWFN 8G9)
11555 Rockville Pike
Rockville, MD 20852-2738

cc (with Enclosures 2,3, and 4 only):

Ms. Jo A. Sanford
Chair - North Carolina Utilities Commission
P.O. Box 29510
Raleigh, NC 27626-0510

Ms. Beverly O. Hall, Section Chief
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North Carolina Department of Environment and Natural Resources
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BSEP 04-0043
Enclosure 2

Global Nuclear Fuel - Americas, LLC
Affidavit of Proprietary Information

Affidavit

I, Jens G. M. Andersen, state as follows:

(1) I am Fellow and project manager, TRACG Development, 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, "Response to Request for Additional Information No. 7 Relating to Proposed Amendment to License No. DPR-71 Brunswick Steam Electric Plant, Unit 1 Docket No. 50-325" dated March 18, 2004. GNF proprietary information is indicated by enclosing it in double brackets. In each case, the superscript notation [3] refers to Paragraph (3) of this affidavit, which provides the basis for the proprietary determination.

(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 2.390(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) To address the 10 CFR 2.390 (b) (4), 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 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.

I declare under penalty of perjury that the foregoing affidavit and the matters stated therein are true and correct to the best of my knowledge, information, and belief.

Executed at Wilmington, North Carolina, this 18th day of March, 2004.

Jens G. M. Andersen

Jens G. M. Andersen
Global Nuclear Fuel – Americas, LLC

Framatome ANP
Affidavit of Proprietary Information

AFFIDAVIT

COMMONWEALTH OF VIRGINIA)
) ss.
CITY OF LYNCHBURG)

1. My name is Gayle F. Elliott. I am Manager, Product Licensing in Regulatory Affairs, for FANP, and as such I am authorized to execute this Affidavit.

2. I am familiar with the criteria applied by FANP to determine whether certain FANP information is proprietary. I am familiar with the policies established by FANP to ensure the proper application of these criteria.

3. I am familiar with the information referenced in letter serial BSEP 04-0043 from Cornelius J. Gannon, Progress Energy Carolinas, Inc. (PEC), to the U. S. Nuclear Regulatory Commission dated March 18, 2004, under subject of "Brunswick Steam Electric Plant, Unit No. 1, Docket No. 50-325/License No. DPR-71, Response to Request for Additional Information" and referred to herein as "Document." Information contained in this Document has been classified by FANP as proprietary in accordance with the policies established by FANP for the control and protection of proprietary and confidential information.

4. This Document contains information of a proprietary and confidential nature and is of the type customarily held in confidence by FANP and not made available to the public. Based on my experience, I am aware that other companies regard information of the kind contained in this Document as proprietary and confidential.

5. This Document has been made available to the U.S. Nuclear Regulatory Commission in confidence with the request that the information contained in this Document be withheld from public disclosure.

6. The following criteria are customarily applied by FANP to determine whether information should be classified as proprietary:

(a) The information reveals details of FANP's research and development plans and programs or their results.

(b) Use of the information by a competitor would permit the competitor to significantly reduce its expenditures, in time or resources, to design, produce, or market a similar product or service.

(c) The information includes test data or analytical techniques concerning a process, methodology, or component, the application of which results in a competitive advantage for FANP.

(d) The information reveals certain distinguishing aspects of a process, methodology, or component, the exclusive use of which provides a competitive advantage for FANP in product optimization or marketability.

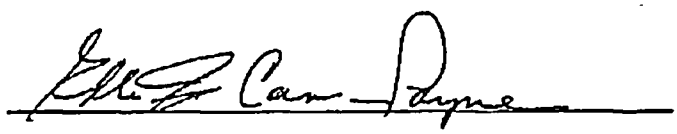
(e) The information is vital to a competitive advantage held by FANP, would be helpful to competitors to FANP, and would likely cause substantial harm to the competitive position of FANP.

7. In accordance with FANP's policies governing the protection and control of information, proprietary information contained in this Document have been made available, on a limited basis, to others outside FANP only as required and under suitable agreement providing for nondisclosure and limited use of the information.

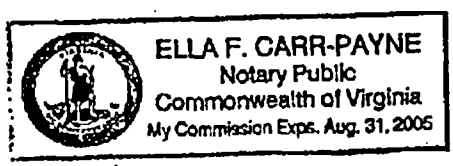
8. FANP policy requires that proprietary information be kept in a secured file or area and distributed on a need-to-know basis.

9. The foregoing statements are true and correct to the best of my knowledge, information, and belief.

SUBSCRIBED before me this 18th
day of March, 2004.



Ella F. Carr-Payne
NOTARY PUBLIC, STATE OF VIRGINIA
MY COMMISSION EXPIRES: 8/31/05



BSEP 04-0043
Enclosure 4

Response to Request for Additional Information
(Non-proprietary Version)

RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION NO. 7 RELATING TO PROPOSED AMENDMENT TO LICENSE NO. DPR-71 BRUNSWICK STEAM ELECTRIC PLANT, UNIT 1 DOCKET NO. 50-325

NRC Question 7

In the March 11, 2004 telephone conference, Progress Energy indicated that they had available some core follow data from EPU Cycle 14. Since BSEP Unit 1 is using POWERPLEX II (based on CASMO-3G/MICROBURN-B) core monitoring system, the higher GETAB SLMCPR uncertainties were used in the SLMCPR calculations. Considering the current operating strategies, the staff wants to determine if the uncertainties used in SLMCPR calculations and licensing codes are still conservative.

(a) Is core follow data available for the uprated conditions (Cycle 14)?

(b) Using the core follow data for the uprated conditions, please compare the TIP uncertainties data obtained from your measured and predicted TIP reading. Provide an evaluation of how the combined GETAB TIP reading and the bundle power uncertainties compare with the uncertainties associated with your core monitoring code system. Since GE's GETAB TIP uncertainty combination may differ from the Framatome uncertainty treatment methods, please ensure that the associated TIP uncertainties are combined to make the comparison applicable.

Response to 7(a)

Core follow data is available for operation at 2755 MWt (94.2% of 2923 MWt licensed rated thermal power) for the greater portion of Cycle 14. The cycle began operation at 2558 MWt licensed rated thermal power and increased power to 2755 MWt approximately 1600 MWd/MT into the cycle.

Response to 7(b): Measured versus Predicted TIP Responses

The uncertainty in the four bundle integrated power surrounding a given TIP string, σ_{P4B}, can be determined by comparing the axially integrated TIP signal from recent operating cycles with the 3-D simulator solutions.

$$\sigma_{P4B} = \sqrt{\sum_{i=1}^{N}\left(\sum_{j=1}^{M} TIPmeas\ (i,j)/M - \sum_{j=1}^{M} TIPpred\ (i,j)/M\right)^2 /(N-1)}$$

where:

TIP meas (i,j)	=	the measured neutron equivalent TIP reading in string i and axial location j
TIP pred (i,j)	=	the predicted neutron equivalent TIP reading in string i and axial location j predicted by CASMO-3G/MICROBURN-B
M	=	25 axial locations
N	=	31 TIP strings

The root mean square cycle average value of σ_{P4B} for CASMO-3G/MICROBURN-B is provided for BSEP Unit 1 Cycles 12 through 14. The number of TIP measurements in Cycles 12, 13, and 14 was 15, 18, and 19, respectively. The largest cycle average σ_{P4B} occurred in Cycle 13 and was [[ ]].

The cycle average value of core average void and core average exit void, and the cycle maximum channel void are also provided for Cycles 12 through 15. Void conditions for Cycles 12 through 14 are based on core follow calculations and the void conditions for Cycle 15 are projected based on MELLLA+ operation. This comparison shows no statistically significant correlation between σ_{P4B} and void conditions, as shown in the attached table.

Response to 7(b): Comparison of GE GETAB and FANP Uncertainties

The five GETAB uncertainty components associated with the Reference 1 SLMCPR methodology are described on Page 2-9 of Reference 1. Two of these components, TIP random error and TIP uncertainty due to geometry, are associated with the TIP instrument response and are not specific to a particular core monitoring system. The remaining three GETAB uncertainty components relate to bundle power uncertainty and are associated with the core monitoring system.

The B1C15 SLMCPR was calculated using the revised uncertainty methodology with GETAB uncertainties described in Reference 1. The B1C15 SLMCPR calculation supports an integral bundle power uncertainty of 4.30%. When defined as integral uncertainties instead of nodal uncertainties the remaining three uncertainty components associated with bundle power uncertainty combine as shown.

[[[3]]]

Each GETAB component of integral bundle power uncertainty is described individually below and the equivalent component for POWERPLEX II (CASMO-3G/MICROBURN-B) (PPX) is also defined.

[[[3]]]

The PPX CMSS performs all calculations in full core geometry and makes no use of instrument location symmetry. The PPX CMSS therefore has no additional uncertainty associated with extrapolation to asymmetric conditions. This uncertainty is not applicable to the PPX CMSS and is taken to be 0.0%.

[[{3}]]

The equivalent uncertainty for PPX is designated as δD_{ij} and is defined by Equation 5.22 in Reference 3. The value of δD_{ij} is identified on Page 145 of Reference 3 and is given as [[ ]].

[[

{3}]]

Reference 2, equation 3-2, defines bundle integrated power model uncertainty as:

[[

{3}]]

Reference 3, equation 5.33, similarly defines integral bundle power uncertainty as a function of MICROBURN-B calculated TIP uncertainty:

$$\delta B_{ij} = \sqrt{(\delta T^2_{ij} / (0.25+0.75*[[\quad]])}$$

In Reference 3 Equation 5.33:

δB_{ij} = σ_{MDL}
δT_{ij} = σ_{P4B} less TIP measurement uncertainty (See Reference 3, Page 147), and
σ_{PAL} is added to δB_{ij} via the equation correlation, i.e. application of Equation 5.33 is equivalent to adding four bundle power uncertainty to predicted TIP uncertainty.

Substituting:

$$\sigma_{MDL} = \sqrt{[\sigma^2_{P4B} / (0.25+0.75*[[\quad]])]}$$

TIP measurement uncertainty should be subtracted from σ_{P4B} in the preceding equation, but it is conservative not to do so and unnecessary to

demonstrate POWERPLEX bundle integral uncertainty is bounded by the bundle integral uncertainty supported by the SLMCPR analysis using the revised uncertainty methodology with GETAB uncertainties.

The highest value of σ_{P4B} in the core follow data presented is [[ ]], giving a value for σ_{MDL} of [[ ]].

Integral bundle power uncertainty is then given by the statistical sum of the individual components

[[[3]]]
= $\sqrt{(0\%^2 + [[\ ]]^2 + [[\ ]]^2)}$
= [[ ]]

This result is bounded by the bundle integral uncertainty of 4.30% supported by the B1C15 SLMCPR analysis using the revised uncertainty methodology with GETAB uncertainties.

References

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

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

3. XN-NF-80-19 (P), Volume 1, Supplement 3, Advanced Nuclear Fuels Methodology for Boiling Water Reactors, Benchmark Results for the CASMO-3G/MICROBURN-B Calculation Methodology, February 1989.

4. XN-NF-80-19 (P)(A), Supplement 4, Advanced Nuclear Fuels Methodology for Boiling Water Reactors, Benchmark Results for the CASMO-3G/MICROBURN-B Calculation Methodology, November 1990.

Attachment to RAI Response 7

Cycle	Nominal Power (MWth)	Cycle Core Average Exit Void	Cycle Core Average Void	Cycle Maximum Channel Void	σ_{P4B}
B1C12	2558	72.2%	44.9%	84.3%	[[ ]]
B1C13	2558	71.9%	44.7%	84.9%	[[ ]]
B1C14	2755	72.8%	46.4%	83.8%	[[ ]]
B1C15	2923	75.1%	47.1%	85.6%	N/A

Notes:

1. Results and measurements for Cycles 12 through 14 are based on actual core follow. MICROBURN-B calculations were performed for the actual plant operating conditions and rod patterns.
2. Cycle 14 began operation at 2755 MWth approximately 1.6 GWD/MT into the cycle.
3. Cycle 15 results were projected assuming MELLLA+ operation using expected operating conditions and rod patterns for the cycle, i.e. limiting licensing rod patterns were not used.
4. Progress Energy calculates CASMO-3G cross sections for POWERPLEX / MICROBURN-B at 80% void.

[[

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