

# **ENERGY NORTHWEST**

P.O. Box 968 ■ Richland, Washington 99352-0968

April 28, 2003  
GO2-03-069

U.S. Nuclear Regulatory Commission  
ATTN: Document Control Desk  
Washington, D.C. 20555

Subject: **COLUMBIA GENERATING STATION, DOCKET NO. 50-397  
REQUEST FOR ADDITIONAL INFORMATION REGARDING A  
REQUEST FOR AMENDMENT TO TECHNICAL SPECIFICATION  
2.1.1.2, MCPR SAFETY LIMIT AND SR 3.3.1.3.2, OSCILLATION  
POWER RANGE MONITOR-LPRM CALIBRATION FREQUENCY**

- References:
- 1) Letter GO2-02-198, dated December 30, 2002, DK Atkinson (Energy Northwest) to NRC, "Request for Amendment to Technical Specification 2.1.1.2, MCPR Safety Limit and SR 3.3.1.3.2, Oscillation Power Range Monitor-LPRM Calibration Frequency"
  - 2) Facsimile dated April 08, 2003, BJ Benney (NRC) to CL Perino (Energy Northwest,) "Request for Additional Information (RAI) Columbia Generating Station"

Dear Sir or Madam:

Energy Northwest requested an amendment to the Columbia Generating Station Technical Specifications (TS) regarding the Minimum Critical Power Ratio Safety Limit (SLMCPR) in TS 2.1.1.2, and the Local Power Range Monitor (LPRM) calibration frequency for the Oscillation Power Range Monitor (OPRM) in Surveillance Requirement (SR) 3.3.1.3.2 (Reference 1). The NRC requested additional information regarding the amendment request in Reference 2.

The purpose of this transmittal is to provide the response to the Request for Additional Information (Reference 2). On April 9, 2003 a teleconference was held between Energy Northwest, Framatome ANP, and the NRC Staff to discuss the Request for Additional Information. The clarifications that resulted from the teleconference are included in the response.

AP01

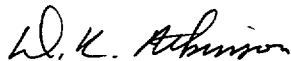
**REQUEST FOR ADDITIONAL INFORMATION REGARDING REQUEST FOR  
AMENDMENT TO TECHNICAL SPECIFICATION 2.1.1.2 AND SR 3.3.1.3.2**

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A portion of the response to Question 2 is provided in the form of electronic files (PDF format) on the enclosed compact disk (CD). Enclosure 5 and the document files found on the CD (Enclosure 8) contain proprietary information. Therefore, pursuant to the requirements of 10 CFR 2.790, affidavits (Enclosures 2 and 3) are provided to support withholding of this information from public disclosure.

If you have any questions or require additional information regarding this matter, please contact Ms. CL Perino, Licensing Manager at (509) 377-2075.

Respectfully,



DK Atkinson  
Vice President, Technical Services  
Mail Drop PE08

Enclosures:

1. Notarized Affidavit
2. Energy Northwest Notarized Affidavit-Proprietary Information
3. Framatome ANP Notarized Affidavit-Proprietary Information
4. Response to Request for Additional Information, Questions 1, 3 and 4
5. Response to Request for Additional Information, Question 2 (Proprietary)
6. Response to Request for Additional Information, Question 2 (Non-proprietary version of Enclosure 5)
7. List of document files included on the Compact Disk (Enclosure 8)
8. Compact Disk-Requested Reference Documents (Proprietary)

cc: EW Merschoff – NRC RIV (w/o Encl 5 and 8)  
RN Sherman – BPA/1399 (w/o Encl 5 and 8)  
TC Poindexter – Winston & Strawn (w/o Encl 5 and 8)  
BJ Benney – NRC NRR (with 2 copies Encl 8)  
NRC Resident Inspector – 988C (w/o Encl 5 and 8)

ENCLOSURE 1 - NOTARIZED AFFIDAVIT

STATE OF WASHINGTON )

Subject: Request for Additional  
Information Regarding  
Amendment to Technical  
Specification 2.1.1.2 and  
SR 3.3.1.3.2

COUNTY OF BENTON )

I, DK Atkinson, being duly sworn, subscribe to and say that I am the Vice President, Technical Services for ENERGY NORTHWEST, the applicant herein; that I have the full authority to execute this oath; that I have reviewed the foregoing; and that to the best of my knowledge, information, and belief the statements made in it are true.

DATE April 28, 2003

DK Atkinson

DK Atkinson

Vice President, Technical Services

On this date personally appeared before me DK Atkinson, to me known to be the individual who executed the foregoing instrument, and acknowledged that he signed the same as his free act and deed for the uses and purposes herein mentioned.

GIVEN under my hand and seal this 28 day of April 2003.

Lori A. Walli

Notary Public in and for the  
STATE OF WASHINGTON

Residing at

Richland

My Commission Expires

3-29-05



ENCLOSURE 2 - NOTARIZED AFFIDAVIT-PROPIETARY INFORMATION

STATE OF WASHINGTON )

Subject: Framatome-ANP Letter Report  
DGC:03:008, Attachment A  
(FRAEN:03:084) [Columbia Generating  
Station, Docket No. 50-397, Submittal  
of Request for Additional Information  
for Request for Amendment to  
Technical Specifications 2.1.1.2, MCPR  
Safety Limit and SR 3.3.1.3.2,  
Oscillation Power Range Monitor-  
LPRM Calibration Frequency]

COUNTY OF BENTON )

I, DK Atkinson, being duly sworn, subscribe to and say that I am the Vice President, Technical Services for ENERGY NORTHWEST, the applicant herein; that I have the full authority to execute this oath; that I have reviewed the foregoing; and that to the best of my knowledge, information, and belief the statements made in it are true.

Enclosures 5 and 8 to this letter contain information from the subject Framatome ANP letter report that is considered by Framatome ANP to be proprietary. Enclosure 3 is an affidavit executed by Jerald S Holm, Manager, Product Licensing for Framatome ANP, dated April 22, 2003 which provides the basis on which it is claimed that the subject documents should be withheld from public disclosure under the provisions of 10 CFR 2.790.

Energy Northwest treats the subject documents as proprietary information on the basis of statements by the owner. In submitting this information to the NRC, Energy Northwest requests that the subject documents be withheld from public disclosure in accordance with 10 CFR 2.790.

DATE April 28, 2003

DK Atkinson  
DK Atkinson  
Vice President, Technical Services

On this date personally appeared before me DK Atkinson, to me known to be the individual who executed the foregoing instrument, and acknowledged that he signed the same as his free act and deed for the uses and purposes herein mentioned.

GIVEN under my hand and seal this 28 day of April, 2003.



Lori A. Walli  
Notary Public in and for the  
STATE OF WASHINGTON

Residing at Richland  
My Commission Expires 3-29-05

**ENCLOSURE 3**

**Framatome ANP Notarized Affidavit-Proprietary Information**

## AFFIDAVIT

STATE OF WASHINGTON    )  
                                  ) ss.  
COUNTY OF BENTON       )

1.       My name is Jerald S. Holm. I am Manager, Product Licensing, for Framatome ANP ("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 FANP information attached to the Energy Northwest letter G02-03-069, 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 contain 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.

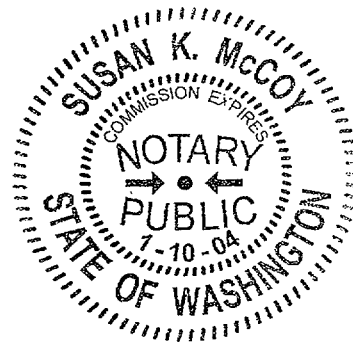
9. The foregoing statements are true and correct to the best of my knowledge,  
information, and belief.

*[Signature]*

SUBSCRIBED before me this 22<sup>nd</sup>  
day of April, 2003.

*[Signature]*

Susan K. McCoy  
NOTARY PUBLIC, STATE OF WASHINGTON  
MY COMMISSION EXPIRES: 1/10/04





**Question 1:**

**“Cycle 17 will be the first cycle of operation with a mixed core of ABB/CE/Westinghouse SVEA-96 fuel and Framatome ANP ATRIUM-10 reload fuel. Provide a flow chart for the calculation interface and identify those key parameters in the calculation. Also, describe any applicable safeguard procedures used to verify that the mixed core analysis for the SLMCPR are accurate without any possible input errors for the calculation, and identify any routine check-out processes to verify that the result of the calculation for SLMCPR is conservative.”**

*Clarification:*

*The safety limit calculation is the intended calculation to address in this question.*

*With regards to the last sentence, provide a description of the processes used to ensure the information that is transmitted between the interfaces is accurate, correctly applied and the results are consistent and reasonable. Reference any procedures that implement the processes described.*

**Response:**

A flow chart, Figure 1, shows the Energy Northwest and Framatome ANP processes and interfaces that were utilized in determining the SLMCPR for Cycle 17. Table 1 provides a summary of the procedures and documents identified on the flow chart. Each summary describes the activity involved in the respective step of the overall design control process. Those steps that involve review of data for accuracy and completeness are shown on the figure and described in the table. The design control process complies with the requirements of 10 CFR 50 Appendix B.

The boxes in the flow chart identify the major activities associated with the overall design control process. The organization(s) responsible for each major activity is shown above each box. Implementing procedure(s) and the internal document(s) or output result, for each major activity are listed below each box.

Key parameters associated with the activity were obtained for the areas identified on the flow chart. More specific information regarding the parameters used in the SPCB CPR correlation is provided in ENFRA-02-035 and ENFRA-02-041 (Enclosure 4, References A.4 and A.5 and Table A.1 of Reference 1).

Based on following the process described above, we are confident that the data transmitted between Energy Northwest and Framatome ANP are accurate and the results are consistent and reasonable.

# ENCLOSURE 4 – RESPONSE TO RAI QUESTIONS 1, 3, and 4

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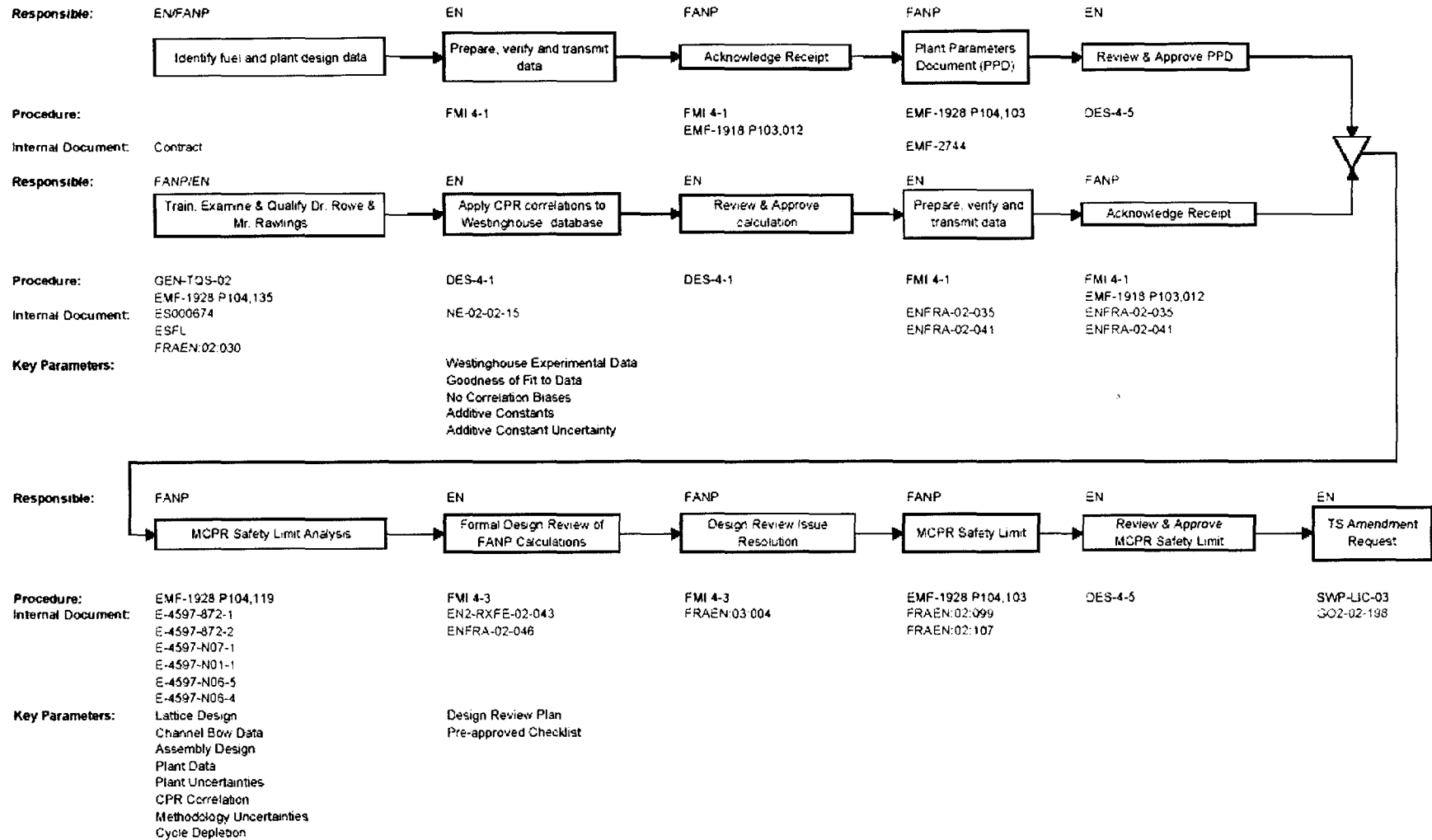


Figure 1

Design Control Process: Calculation Interface, Procedures & Check-out (Design Review) Process

**ENCLOSURE 4 – RESPONSE TO RAI QUESTIONS 1, 3, and 4****Page 3 of 11****Table 1: Calculation Interface, Procedures & Check-out (Design Review) Process**

Procedure / Internal Document	Reference	Summary
Contract	C-31700, Nuclear Reload Fuel Fabrication and Associated Services for Columbia Generating Station, January 2002	Framatome ANP & Energy Northwest defined the SVEA-96 fuel and Columbia Generating Station (CGS) plant data necessary to build and qualify Framatome ANP models.
DES-4-1	Revision 3, "Preparation, Verification and Approval of Calculations," Design Engineering Procedures and Instructions, Volume 2, Energy Northwest, June 17, 2002	This procedure defines the process for preparing, verifying and approving calculations for Energy Northwest Engineering.
DES-4-5	Revision 0, "Reviewing Technical Submittals/Vendor Transmittals," Design Engineering Procedures and Instructions, Volume 2, Energy Northwest, May 20, 2002	This procedure specifies the process for reviewing and approving technical submittals / vendor transmittals.
E-4597-872-1	Calculation Notebook "Columbia Generating Station Cycle 17 MCPR Safety Limit Analysis," Framatome ANP, November 2002	Framatome ANP Calculation.
E-4597-872-2	Calculation Notebook "Columbia Generating Station SVEA-96 Sub-Assembly Power and Flow Split Uncertainty," Framatome ANP, October 2002	Framatome ANP Calculation.
E-4597-N01-1	Calculation Notebook "CGS-1 CASMO4 Cross Section Generation," Framatome ANP, September 2002	Framatome ANP Calculation.
E-4597-N06-4	Calculation Notebook "Columbia Generating Station Cycle 17 Fuel Cycle and Licensing Design," Framatome ANP, November 2002	Framatome ANP Calculation.
E-4597-N06-5	Calculation Notebook "CGS-1 Cycle 17 Channel Bow Analysis (Neutronics)," Framatome ANP, November 2002	Framatome ANP Calculation.
E-4597-N07-1	Calculation Notebook "Columbia Generating Station - 1 Fabrication Batch CGS-1 ATRIUM-10 Cross-Section Library Generation and FUELRQ Uranium Requirements," Framatome ANP, October 2002	Framatome ANP Calculation.
EMF-1918 P103,012	Revision 1, "Control of Customer-Supplied Correspondence," Framatome ANP, November 2000	Procedure that ensures that data provided by the customer is appropriately controlled.
EMF-1928 P104,103	Revision 3, "Engineering Work Practices Review Process for Design Analysis Documentation," Framatome ANP, September 12, 2001	Identifies responsibilities for preparation, review, approval and transmittal of design analysis documentation to ensure high quality in the information transmitted.
EMF-1928 P104,119	Revision 5, "Engineering Work Practices Calculation Notebooks", Framatome ANP, March 28, 2001	Describes the process for preparing, reviewing, archiving and revising calculation notebooks.

# ENCLOSURE 4 – RESPONSE TO RAI QUESTIONS 1, 3, and 4

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**Table 1: Calculation Interface, Procedures & Check-out (Design Review) Process**

Procedure / Internal Document	Reference	Summary
EMF-1928 P104,135	Revision 0, "Engineering Work Practices Guidelines to Qualify a Licensee to Use NRC Approved Analysis Methods," Framatome ANP, May 2000.	Specifies the requirements for qualifying a licensee to use Framatome ANP's analysis methods that have been approved by the NRC. These requirements are intended to meet the guidelines of Generic Letter 83-11, Supplement 1.
EMF-2744(P)	Revision 0, "Columbia Generating Station Cycle 17 Plant Parameters Document," Framatome ANP, August 2002	Framatome ANP specification of CGS plant and fuel data to be used in safety analysis.
EN2-RXFE-02-043	RE Stout to LC Linik, "LOCA, MCPR Safety Limit, and Thermal Hydraulic Design Review Report," Interoffice Memorandum, Energy Northwest, December 31, 2002	Energy Northwest design review report prepared per FMI 4-3.
ENFRA-02-035	Letter, dated October 18, 2002, DF Richey (EN) to JL Raklios (FANP), "Columbia Generating Station Reload Fuel Design Data Package Transmittal No. 012"	Data transmittal prepared per FMI 4-1: Results of Energy Northwest calculation NE-02-02-15.
ENFRA-02-041	Letter, dated November 18, 2002, DF Richey (EN) to JL Raklios (FANP), "Columbia Generating Station Reload Fuel Design Data Package Transmittal No. 015"	Data transmittal prepared per FMI 4-1: Results of Energy Northwest calculation NE-02-02-15.
ENFRA-02-046	Letter dated December 19, 2002, LC Linik (EN) to JL Raklios (FANP), "Open Items and Observations from Nov 20, 2002 Design Review"	Transmittal of unresolved issues from the design review conducted per FMI 4-3.
ES000674	Revision 0, "CPR Correlation Development," Energy Northwest Personnel Qualification Database	Qualification guide for applying Framatome ANP CPR Correlations to CPR test data prepared per GEN-TQS-02. This document incorporates Framatome ANP training materials, applicable procedures and Framatome ANP certification of Dr. Rowe and Mr. Rawlings into Energy Northwest's qualification & training program.
ESFL	Revision 0, "Calculation," Energy Northwest Personnel Qualification Database	Qualification guide for Energy Northwest calculations per DES 4-1 prepared per GEN-TQS-02. This was required for Dr. Rowe and Mr. Rawlings to prepare and verify calculation NE-02-02-15.

# ENCLOSURE 4 – RESPONSE TO RAI QUESTIONS 1, 3, and 4

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**Table 1: Calculation Interface, Procedures & Check-out (Design Review) Process**

Procedure / Internal Document	Reference	Summary
FMI 4-1	Revision 1, "Design Interface Instruction," Fuel Management Instructions, Engineering Instructions Volume II, Energy Northwest, January 6, 1993	FMI 4-1 applies to the exchange of quality affecting design information. This ensures that interfaces between organizations are properly identified and controlled and that the efforts of participating design organizations are appropriately coordinated. An Energy Northwest engineer prepares the requested design information. An independent Energy Northwest verifier reviews the information to confirm that it is suitable for the intended use. The recipient (Framatome ANP) returns a receipt acknowledgement.
FMI 4-3	Revision 6, "Reload and Fuel Design Reviews," Fuel Management Instructions, Engineering Instructions Volume II, Energy Northwest, September 18, 2002	FMI 4-3 describes the requirements and responsibilities for conducting design reviews of reload nuclear fuel. Energy Northwest prepared a design review plan to identify the scope and assign reviewers. Based upon the Framatome ANP safety limit report, Energy Northwest prepared and approved a checklist, utilizing the reviewers' expertise, contract specifications, operating requirements, topical reports and industry operating experience. Framatome ANP calculations were reviewed by Energy Northwest and independent consultants and checklist questions answered. Unresolved issues were transmitted to Framatome ANP for resolution. Energy Northwest reviewed and approved the resolution or schedule for resolution. Energy Northwest issued a report summarizing the review, conclusions, and the status of the unresolved issues.
FRAEN:02:030	Letter, dated June 24, 2002, JL Raklios (FANP) to JD Fisher (EN), "CPR Correlation Development Training"	Framatome ANP certified that Dr. Rowe and Mr. Rawlings were trained with respect to Framatome ANP CPR Correlation methodology.
FRAEN:02:099	Letter, dated December 4, 2002, JL Raklios (FANP) to JD Fisher (EN), "Columbia Generating Station Cycle 17 MCPR Safety Limit Analysis"	Safety Limit Report.
FRAEN:02:107	Letter, dated December 18, 2002, JL Raklios (FANP) to JD Fisher (EN), "Columbia Generating Station Cycle 17 MCPR Safety Limit Analysis Report Modifications"	Modifications to the Safety Limit Report.
FRAEN:03:004	Letter, dated January 17, 2003, JL Raklios (FANP) to JD Fisher (EN), "FANP Responses to Open Items and Observations from November 20, 2002 Design Review"	Framatome ANP response to ENFRA-02-046 submitted for resolution of design review issues per FMI 4-3.

**ENCLOSURE 4 – RESPONSE TO RAI QUESTIONS 1, 3, and 4****Page 6 of 11****Table 1: Calculation Interface, Procedures & Check-out (Design Review) Process**

Procedure / Internal Document	Reference	Summary
GEN-TQS-02	Revision 5, "Training and Qualification of Plant and Contractor Personnel," Plant Procedures Manual, Energy Northwest, February 11, 2003	This procedure defines the process to determine and document the qualification requirements of Energy Northwest and contractor personnel who perform dependent or independent work on Structures, Systems, or Components Important-to-Safety in support of Columbia Generating Station.
GO2-02-198	Letter, dated December 30, 2002, DK Atkinson (EN) to NRC, "Columbia Generating Station, Docket No. 50-397; Request for Amendment to Technical Specification 2.1.1.2, MCPR Safety Limit and SR 3.3.1.3.2, Oscillation Power Range Monitor-LPRM Calibration Frequency"	Request for Amendment to Technical Specification 2.1.1.2, MCPR Safety Limit And SR 3.3.1.3.2, Oscillation Power Range Monitor-LPRM Calibration Frequency.
NE-02-02-15	Revision 0, "Computation of SPCB Critical Power Correlation Additive Constants for SVEA-96 Fuel," Energy Northwest calculation, November 15, 2002	This calculation is for Energy Northwest to use the Westinghouse CPR test data for SVEA-96 and fit into the Framatome CPR correlation to generate additive constants and uncertainties for use by Framatome for Cycle 17 reload analysis and beyond with co-resident SVEA-96 fuel in the core.
SWP-LIC-03	Revision 4, "Licensing Document Change Process," Site-Wide Procedures Manual, Energy Northwest, January, 29, 2003	The purpose of this procedure is to define the requirements and process for changing the licensing documents specified therein (e.g. Technical Specifications). It assigns responsibilities, details document specific criteria, and specifies the administrative processing requirements for licensing document change packages from their initial generation to their final approval.

**Question 3:**

**“Please describe limitations, if any, for the topical reports, EMF-2245(P)(A), ‘Application of SIEMENS Power Corporation’s Critical Power Correlations to Co-Resident Fuel’ and EMF-2209(P)(A), ‘SPCB Critical Power Correlation’ with respect to their application to and impact on the mixed core SLMCPR calculations. Please identify who are those two consultants and what specific information resulted from their evaluation were provided to FRA-ANP for the SLMCPR calculations. Also, explain and verify using Figures A.3 and A.4 that the once burned SVEA-96 fuel assemblies in the mixed core dominate in the Cycle 17 operation. Provide justification including any penalty imposed on the analysis that the above topical reports are valid for Cycle 17 SLMCPR calculation if the once burned SVEA-96 fuel dominates the Cycle 17 operation.”**

*Clarification:*

*The discussion regarding the limitations for the topical reports should provide justification that the methodology applies to SVEA-96. This justification will address any penalty imposed on the once burned SVEA-96 fuel.*

*It was agreed that the SVEA-96 dominates the core for most of the cycle. Provide figures, similar to Figure A.3 and A.4 that show the Radial Power Distribution and MFLCPR Distribution for the core at the limiting cycle exposure (6000 MWd/MTU) used in the safety limit calculation. Identify the dominant once burned SVEA-96 core locations.*

**Response:**

The direct process described in topical report EMF-2245(P)(A) was used to develop the SPCB critical power correlation additive constants and additive constant uncertainty for the SVEA-96 fuel assemblies. The direct process is applicable to the SVEA-96 fuel since:

1. Sufficient experimental data were available.
2. A rigorous statistical evaluation of the SPCB critical power correlation for the SVEA-96 fuel was performed to determine the standard deviation of the Experimental Critical Power Ratio (ECPR) data and the additive constants.
3. There were no unexpected trends in the correlation.
4. The SVEA-96 critical power experimental data ranges are adequate for the intended use of the correlation and are comparable to those used to develop the SPCB correlation.

The direct process was used to assess the applicability of various approved Framatome ANP critical power correlations for SVEA-96 fuel. The SPCB critical power correlation (EMF-2209(P)(A)) was deemed appropriate for use with the SVEA-96 fuel. The evaluation results showed a reasonable fit to the data and had no unexpected trends as discussed in GO2-02-198 Enclosure 4, References A.4 and A.5 (Reference 1). The SVEA-96 additive constants and additive constant uncertainty results of the critical power correlation evaluation, as determined by the consultants, were used in the CGS Cycle 17 mixed core SLMCPR calculations. No CPR penalty is imposed on the SVEA-96 fuel.

## **ENCLOSURE 4 – RESPONSE TO RAI QUESTIONS 1, 3, and 4**

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The two consultants involved in performing the critical power correlation development for SVEA-96 fuel are Dr. Donald S. Rowe and Mr. James C. Rawlings. Dr. Rowe was the principal investigator and Mr. Rawlings performed a technical review of Dr. Rowe's work. The consultants were qualified to perform the investigation in accordance with the guidelines of GL 83-11, Supplement 1 as described in GO2-02-198 Enclosure 3, Section 4.1.1 (Reference 1).

The SVEA-96 fuel is the limiting MCPR fuel for most of the cycle. Figures 1 and 2 are provided to show the radial power and MFLCPR distribution at the core limiting exposure (6000 MWd/MTU) from the MCPR safety limit calculations. The dominant SVEA-96 MCPR assemblies are identified in shaded locations on the figures. GO2-02-198 Enclosure 4, Figure A-2 (Reference 1) is a quarter core loading map for Cycle 17. The location of all assemblies and the cycle in which they were loaded are shown on this map and can be used to identify assemblies associated with the properties shown on Figures 1 and 2.



## ENCLOSURE 4 – RESPONSE TO RAI QUESTIONS 1, 3, and 4

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1.127	1.306	1.227	1.027	0.987	1.331	1.337	1.427	1.310	1.322	1.141	0.832	0.695	0.564	0.325
1.308	1.310	1.350	1.273	1.332	1.294	1.403	1.310	1.391	1.259	1.235	1.022	0.887	0.703	0.336
1.230	1.351	1.340	1.389	1.333	1.327	1.300	1.337	1.256	1.298	1.187	1.121	0.947	0.616	0.340
1.030	1.274	1.390	1.293	1.345	1.316	1.343	1.039	1.057	1.185	1.241	1.099	0.952	0.611	0.331
0.990	1.336	1.335	1.347	1.261	1.392	1.307	1.070	0.998	1.230	1.183	1.102	0.907	0.583	0.307
1.337	1.299	1.332	1.319	1.394	1.303	1.378	1.252	1.276	1.152	1.183	1.025	0.887	0.519	0.269
1.344	1.410	1.305	1.348	1.314	1.380	1.281	1.343	1.238	1.216	1.077	0.947	0.657	0.425	0.199
1.436	1.317	1.344	1.043	1.074	1.256	1.345	1.287	1.253	1.079	1.007	0.806	0.515	0.270	
1.318	1.400	1.265	1.064	1.004	1.283	1.244	1.256	1.129	1.036	0.872	0.587	0.360		
1.333	1.267	1.309	1.195	1.242	1.160	1.225	1.083	1.039	0.922	0.613	0.385	0.195		
1.150	1.247	1.198	1.256	1.200	1.199	1.088	1.017	0.878	0.642	0.398				
0.841	1.032	1.136	1.116	1.120	1.043	0.965	0.819	0.588	0.384					
0.702	0.899	0.971	0.970	0.928	0.910	0.702	0.527	0.366	0.199					
0.572	0.716	0.628	0.626	0.602	0.536	0.441	0.278							
0.331	0.343	0.349	0.338	0.316	0.276	0.207								

**Figure 1 Radial Power Distribution  
for Cycle 17 at 6000 MWd/MTU\***

0.789	0.724	0.759	0.567	0.769	0.723	0.858	0.777	0.825	0.710	0.756	0.453	0.464	0.361	0.315
0.725	0.860	0.744	0.835	0.732	0.809	0.776	0.823	0.768	0.777	0.670	0.645	0.487	0.468	0.320
0.770	0.745	0.862	0.770	0.859	0.817	0.818	0.728	0.796	0.706	0.781	0.603	0.608	0.393	0.341
0.569	0.837	0.771	0.816	0.754	0.815	0.745	0.771	0.599	0.721	0.681	0.700	0.517	0.384	0.328
0.772	0.734	0.862	0.754	0.801	0.777	0.822	0.605	0.703	0.681	0.731	0.598	0.589	0.378	0.314
0.727	0.812	0.818	0.821	0.778	0.833	0.765	0.795	0.710	0.688	0.652	0.660	0.585	0.325	0.278
0.863	0.780	0.821	0.748	0.829	0.766	0.837	0.741	0.782	0.673	0.714	0.513	0.440	0.291	0.208
0.783	0.815	0.733	0.775	0.608	0.799	0.742	0.802	0.690	0.644	0.548	0.423	0.355	0.246	
0.831	0.773	0.801	0.603	0.709	0.714	0.786	0.687	0.748	0.565	0.566	0.400	0.384		
0.716	0.784	0.709	0.742	0.688	0.693	0.674	0.697	0.568	0.591	0.421	0.383	0.227		
0.764	0.677	0.788	0.690	0.742	0.664	0.720	0.553	0.570	0.448	0.371				
0.457	0.662	0.612	0.710	0.612	0.623	0.523	0.430	0.406	0.354					
0.470	0.494	0.618	0.523	0.602	0.599	0.498	0.361	0.389	0.232					
0.364	0.476	0.395	0.400	0.387	0.335	0.300	0.272							
0.320	0.326	0.349	0.334	0.322	0.285	0.216								

**Figure 2 MFLCPR Distributions  
for Cycle 17 at 6000 MWd/MTU\***

\* Radial power and MFLCPR are generally quarter-core symmetric.

**Question 4:**

**“A difference between Surveillance Requirement (SR) 3.3.1.3.2, the Local Power Range Monitor (LPRM) calibration frequency specified in the TS for the Oscillation Power Range Monitor (OPRM), and SR 3.3.1.1.7, Reactor Protection System (RPS) Instrumentation. It appears that the 1000 MWD/T is specified in the Standard Technical Specifications. Provide the rationale for using 1300 MWD/T instead of 1000 MWD/T for the consistence and identify the benefit of this proposed change.”**

*Clarification:*

*The requested change is for 1130 MWD/T and not 1300 MWD/T.*

**Response:**

We agree that the surveillance frequency specified in NUREG-1434 Revision 1, “Standard Technical Specifications, General Electric BWR/6 Plants,” dated April 1995 does specify 1000 MWD/T as the local power range monitor (LPRM) calibration frequency. However, as part of the Columbia Generating Station program to implement Improved Technical Specifications (ITS), a frequency of 1130 MWD/T was proposed and accepted by the NRC as discussed in the NRC Safety Evaluation Report (SER) for License Amendment 149 which approved the ITS for implementation. This Safety Evaluation Report is identified in Reference 1, GO2-02-198, Enclosure 3, page 9 of 9 as Reference 7.5. Specific discussion regarding the approval is provided on page 61 of the SER. A similar discussion is provided on page 5 of 9 of Enclosure 3.

The current license amendment request will remove an inconsistency in RPS/LPRM calibration frequency approved during implementation of the ITS and the LPRM calibration frequency that was specified for the Oscillation Power Range Monitor (OPRM) and implemented at a later time. Justification for revising the OPRM/LPRM calibration frequency to be consistent with the RPS/LPRM calibration frequency is based upon the discussion in the NRC approved topical reports for the OPRM. Reference 7.10, identified in GO2-02-198 on Enclosure 3, page 9 of 9 (Reference 1), describes the BWR Owner’s Group long-term stability solutions. Section A.4.4, beginning on page A-50, (Ref. 7.10) provides guidance on the Technical Specification implementation philosophy for the OPRM. The guidance indicates that, “The LPRM operability requirements for the APRMs will be sufficient and, therefore, no additional LPRM requirements for the OPRM will be necessary.”

Columbia is implementing ABB Option III for the OPRM. Further discussion regarding the OPRM/LPRM calibration frequency is provided in the NRC approved topical report for ABB Option III. Reference 7.9, identified in GO2-02-198 on Enclosure 3 page 9 of 9, describes ABB Option III and provides suggested Technical Specifications for the OPRM. Section 4.4 beginning on page 29 (Ref. 7.9), provides guidance on the OPRM Technical Specifications. The first paragraph acknowledges that plant specific technical specifications may differ from the BWR standard technical specifications and that the final specification applicability and changes needed for implementing the OPRM will be determined on a plant-by-plant basis. It is noted on page 33 of 54 that the suggested frequency of [1000 MWD/T] is in brackets. Since this number is in brackets, it is intended that plant specific information should be provided where applicable. The requested change to 1130 MWD/T for the OPRM/LPRM calibration frequency is consistent with the previously approved plant specific information.

**ENCLOSURE 4 – RESPONSE TO RAI QUESTIONS 1, 3, and 4**

**Page 11 of 11**

The benefit of this change will be removal of an inconsistency in the Columbia Generating Station Technical Specifications. In addition, it will provide more flexibility in scheduling the surveillance during the workweek it comes due.

**ENCLOSURE 6 – RESPONSE TO RAI QUESTIONS 2 (NON-PROPRIETARY  
VERSION OF ENCLOSURE 5)**

**Page 1 of 2**

**Question 2:**

**“There are lots of references cited in this TS Amendment Request. Provide a CD to cover those approved methodologies used to support this TS amendment.”**

*Clarification:*

*(These electronic files will be submitted in the agreed upon format: PDF image)*

*The following references as listed in the submittal are requested:*

*Enclosure 3, page 9 of 9: References 7.1, 7.2, 7.3, and 7.5*

*Enclosure 4, page A-2: References A.1 through A.10. Note duplication with References 7.1, 7.2 and 7.3.*

*Enclosure 4 of the amendment request included Table A.1. Provide a discussion on how the uncertainties for the Assembly Radial Peaking, Quadrant Power and Quadrant Flow shown in the table were determined and reference the internal document that provides the detail.*

**Response:**

All references requested are identified on the list provided as Enclosure 7 and included in the compact disk enclosed with this transmittal (Enclosure 8).

**Assembly Radial Power Uncertainty.** The process described in the attachment to Reference A.10 under the heading, “Future – Core Power Uncertainty Approach,” was used to determine the radial power uncertainty. The development of the value used in the CGS Cycle 17 analysis is documented in calculation notebook E-2502-862-1, “MICROBURN-B2 Based Impact of Failed/Bypassed LPRMs and TIPs and Extended LPRM Calibration Interval on Radial Power Uncertainties.”

Due to the water cross design of the SVEA-96 fuel assembly, only minimal flow communication exists between the assembly quadrants. [

]. The safety limit methodology (ANF-524(P)(A)) requires that the uncertainty of the parameters used to calculate the critical power be included in the calculation. Therefore, the MCPR safety limit calculations [

].

[

**ENCLOSURE 6 – RESPONSE TO RAI QUESTIONS 2 (NON-PROPRIETARY  
VERSION OF ENCLOSURE 5)**

**Page 2 of 2**

## ENCLOSURE 7, LIST OF DOCUMENT FILES INCLUDED ON THE CD

Page 1 of 2

- 1) As identified on Letter GO2-02-198, Enclosure 3, page 9 of 9. For Reference 7.5, note specifically the information on page 61 of the Safety Evaluation Report.

- 7.1 Letter GO2-02-138, dated September 3, 2002, R. L. Webring (Energy Northwest) to NRC, "Request for Amendment to Technical Specification 4.2.1 and 5.6.5.b"
- 7.2 EMF-2245(P)(A) Revision 0, "Application of Siemens Power Corporation's Critical Power Correlation to Co-Resident Fuel," Siemens Power Corporation, August 2000
- 7.3 EMF-2209(P)(A) Revision 1, "SPCB Critical Power Correlation," Siemens Power Corporation, July 2000
- 7.4 ANF-524(P)(A) Revision 2 and Supplements 1 and 2, "ANF Critical Power Methodology for Boiling Water Reactors," Advanced Nuclear Fuels Corporation, November 1990
- 7.5 Letter, dated March 4, 1997, Timothy G. Colburn (NRC) to J. V. Parrish (ENW), "Issuance of Amendment for the Washington Public Power Supply System Nuclear Project No. 2 (TAC No. M94226)"

- 2) Not identified on Letter GO2-02-198, Enclosure 3, page 9 of 9 but associated with reference 7.1.

Letter GO2-02-192, dated November 27, 2002, DW Coleman (Energy Northwest) to NRC, "Request for Amendment to Technical Specification 4.2.1 and 5.6.5.b, Corrections to Original Submittal"

- 3) As identified on Letter GO2-02-198, Enclosure 4, Attachment A, page A-2.

References A.1, A.3, and A.6 are also listed above and included only once on the CD.

- A.1 ANF-524(P)(A) Revision 2 and Supplements 1 and 2, ANF Critical Power Methodology for Boiling Water Reactors, Advanced Nuclear Fuels Corporation, November 1990
- A.2 Letter, dated October 3, 2002, D. F. Richey (EN) to J. L. Raklios (FANP), "Columbia Generating Station Final Operating Requirements for Cycle 17," ENFRA-02-028
- A.3 EMF-2209(P)(A) Revision 1, SPCB Critical Power Correlation, Siemens Power Corporation, July 2000

## **ENCLOSURE 7, LIST OF DOCUMENT FILES INCLUDED ON THE CD**

**Page 2 of 2**

- A.4 Letter, dated October 18, 2002, D. F. Richey (EN) to L. Raklios (FANP), "Columbia Generating Station Reload Fuel Design Data Package Transmittal No. 012," ENFRA-02-035
- A.5 Letter, dated November 18, 2002, D. F. Richey (EN) to L. Raklios (FANP), "Columbia Generating Station Reload Fuel Design Data Package Transmittal No. 015," ENFRA-02-041
- A.6 EMF-2245(P)(A) Revision 0, Application of Siemens Power Corporation's Critical Power Correlations to Co-Resident Fuel, Siemens Power Corporation, August 2000
- A.7 Letter, dated November 1, 2002, D. F. Richey (EN) to L. Raklios (FANP), "Columbia Generating Station Reload Fuel Design Data Package Transmittal No. 013," ENFRA-02-039
- A.8 EMF-2158(P)(A), Siemens Power Corporation Methodology for Boiling Water Reactors: Evaluation and Validation of CASMO-4/MICROBURN-B2, Siemens Power Corporation, October 1999
- A.9 EMF-2744(P) Revision 0, Columbia Generating Station Cycle 17 Plant Parameters Document, Framatome ANP, August 2002
- A.10 Letter, dated May 1996, H. Donald Curet (SPC) to H. J. Richings (USNRC), "POWERPLEX<sup>®</sup> Core Monitoring: Failed or Bypassed Instrumentation and Extended Calibration," HDC:96:012, (PROPRIETARY INFORMATION)