

## **NRR-PMDAPem Resource**

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**From:** Klos, John  
**Sent:** Wednesday, January 04, 2017 7:07 AM  
**To:** Garcia, Richard M.  
**Cc:** Klos, John  
**Subject:** Re: RE: NON proprietary Request for Additional Information Regarding Columbia MUR Power Uprate (CAC No. MF8060)

Mr Garcia

I am writing to acknowledge the reschedule of RAIs below to January 13, 2017.

Thank you

John Klos

On: 03 January 2017 15:41, "Garcia, Richard M." wrote:

John,  
We would like to formally request additional time to submit the response to the SRXB questions below. Our ability to deliver these responses by the current January 5<sup>th</sup> due date has been challenged due to a forced plant outage and recovery resulting from a weather related load reject as well as reduced work hours due to adverse weather conditions. A revised due date of January 13, 2017 is requested. Thanks,

**Rick Garcia**

**Licensing**

**Energy Northwest - Columbia**

**Tel 509-377-8463**

**Fax 509-377-4317**

**From:** Klos, John [mailto:John.Klos@nrc.gov]

**Sent:** Tuesday, November 22, 2016 8:06 AM

**To:** Garcia, Richard M.

**Cc:** Watford, Margaret; Klos, John

**Subject:** NON proprietary Request for Additional Information Regarding Columbia MUR Power Uprate (CAC No. MF8060)

**EXTERNAL: Think Before You Click!**

**Email sent from:** "Klos, John" [prvs=127edcf15=John.Klos@nrc.gov](mailto:John.Klos@nrc.gov)

Dear Mr. Garcia,

By letter dated June 28, 2016, (Agencywide Documents Access and Management System (ADAMS) Accession No. ML16183A365), as supplemented by letter dated August 18, 2016 (ADAMS Accession No. ML16231A511), Energy Northwest submitted a license amendment for Columbia Generating Station (CGS). The proposed amendment would revise the operating license and technical specifications to implement an increase in rated thermal power from the current licenses thermal power of 3486 megawatts thermal (MWt) to a measurement uncertainty recapture thermal power of 3544 MWt.

The U.S. Nuclear Regulatory Commission (NRC) staff, specifically the Reactor Systems Branch (SRXB) in the Office of Nuclear Reactor Regulation, has reviewed the submittal and determined that the attached NON – proprietary requests

for additional information (RAIs) are needed to complete its technical review and make a regulatory finding regarding this license amendment request.

Please see the formal RAIs below. A clarification call was held on November 16, 2016 to ensure your staff understood the RAIs. In the clarification call, Energy Northwest agreed to submit the response to the RAIs by Thursday Jan 5, 2017.

**REQUEST FOR ADDITIONAL INFORMATION**

**MEASUREMENT UNCERTAINTY RECAPTURE POWER UPRATE**

**LICENSE AMENDMENT REQUEST**

**COLUMBIA GENERATING STATION**

**DOCKET NO. 50-397**

**CAC NO. MF8060**

By letter dated June 28, 2016, (Agencywide Documents Access and Management System (ADAMS) Accession No. ML16183A365), as supplemented by letter dated August 18, 2016 (ADAMS Accession No. ML16231A511), Energy Northwest submitted a license amendment for Columbia Generating Station (CGS). The proposed amendment would revise the operating license and technical specifications (TS) to implement an increase in rated thermal power from the current licenses thermal power of 3486 megawatts thermal (MWt) to a measurement uncertainty recapture (MUR) thermal power of 3544 MWt.

The U.S. Nuclear Regulatory Commission (NRC) staff, specifically the Reactor Systems Branch (SRXB) in the Office of Nuclear Reactor Regulation, has reviewed the submittal and determined that the following request for additional information (RAIs) are needed to complete its technical review and make a regulatory finding regarding this license amendment request.

**Please note that the proprietary information in this document is identified by underlined text enclosed within double square brackets ([[ ]]). [[This sentence is an example.]]**

**RAI-SRXB-1: Reactor Performance Improvement Features**

The proprietary General Electric-Hitachi (GEH) Report NEDC-33853P, "Safety Analysis Report for Columbia Generating Station Thermal Power Optimization" (TSAR), Revision 0, Section 1.3.2, "Reactor Performance Improvement Features," lists Feedwater Temperature Reduction (FWTR), Feedwater Heater Out-Of-Service (FWHOOS) and Safety Relief Valve (SRV)/Automatic Depressurization System 2 Valves Out-Of-Service (SRVOOS) as the performance improvement and equipment out-of-service features currently licensed at CGS. However, the Core Operating Limit Report (COLR) for Cycle 23 does not have these features and instead, has Pressure Regulator Out-of-Service (PROOS). To meet the requirements of Title 10 of the *Code of Federal Regulations* (10 CFR) 50.9 "Completeness and accuracy of information", please provide justification or confirmation for including FWTR, FWHOOS, and SRVOOS in the next cycle's COLR with the MUR power uprate.

**RAI-SRXB-2: PROOS versus MUR Power Uprate**

The MUR power uprate is based on a design and safety analysis assumption that the reactor dome pressure at the new uprated power level will be maintained at the currently licensed rated condition. To meet the requirements of 10 CFR 50 Appendix A, "General Design Criteria for Nuclear Power Plants," General Design Criterion (GDC) 10 and 15 for assuring the design conditions with respect to the integrity of physical barriers, please justify the impact of PROOS on the MUR power uprate in terms of maintaining the reactor dome pressure.

**RAI-SRXB-3: FWTR and/or FWHOOS versus MUR Power Uprate**

Enclosure 7 of licensee's amendment utilizes NEDC-32938P-A, Thermal Power Optimization Licensing Topical Report, which is referred to as the TLTR and its approved format and content. The TLTR, Appendix C, Section C.2.1 states content that the MUR power uprate is based on a design and safety analysis assumption that the full, standard configuration of feedwater heaters should be in service at the new uprated power level. To meet the requirements of 10 CFR 50, Appendix A, GDC 10 and 15 for assuring the design conditions with respect to the integrity of physical barriers, please justify the appropriateness of FWTR and/or FWHOOS for the MUR power uprate in terms of maintaining the full and standard service of feedwater heaters.

**RAI-SRXB-4: Fuel Thermal Margin Monitoring**

In Section 2.2, "Thermal Limits Assessment," of the TSAR, it states [[

]]. To meet the requirements of 10 CFR 50, Appendix A, GDC 10 and 15 for assuring the design conditions with respect to the integrity of physical barriers, please justify the applicability of the TSAR for use of the 4.8 MWt/bundle basis or provide a plant specific analysis.

**RAI-SRXB-5: Evaluation of Design Changes and Safety Evaluations**

To meet the requirements of 10 CFR 50, Appendix A, GDC 10 and 15 for assuring the design conditions with respect to the integrity of physical barriers and the completeness requirement of 10 CFR 50.9, please provide a summary of the evaluation results for the impact of the MUR power uprate on any design changes/safety evaluations that have not yet been implemented in the latest Updated Final Safety Analysis Report if such design/safety evaluations exist.

**RAI-SRXB-6: Emergency Core Cooling System-Loss-Of-Coolant Accident Performance Analyses**

Table 4.1 of TSAR shows the Emergency Core Cooling System (ECCS) Loss-Of-Coolant Accident (LOCA) analysis results for GNF2 fuel. It is not clear whether the GNF2 fuel is the only fuel type for the upcoming cycle with MUR uprated power. It is noted from the COLR for Cycle 26 that the current cycle reactor core contains GE14 in addition to the GNF2 fuel. TO meet the requirements of 10 CFR 50, Appendix A, GDC 10, GDC 15 and 10 CFR 50.46 for assuring the design and LOCA conditions with respect to the integrity of physical barriers and the completeness and accuracy requirements of 10 CFR 50.9, please provide the analysis result similar to Table 4.1 of TSAR for GE14 if GE14 is applicable and used in the next cycle. In addition, please provide a justification meeting the [[ ]] Peak Cladding Temperature (PCT) margin criteria if GE14 is applicable and used in the next cycle.

**RAI-SRXB-7: Anticipated Operational Occurrences (AOOs)**

To meet the requirements of 10 CFR 50, Appendix A, GDC 10 and 15 for assuring the design conditions with respect to the integrity of physical barriers and the completeness and accuracy requirements of 10 CFR 50.9, please provide information for the following questions relating to Section 9.1, "Anticipated Operational Occurrences," of the TSAR:

- (a) Per the footnotes of Table E-1 of the TLTR, please provide the plant-specific disposition. In other words, is ODYN, READY or TRACG used to perform the analysis? In addition, is a 2% power uncertainty continuously applied?
- (b) As compared with current reload analysis for CGS (Cycle 23 COLR), is the list of AOOs in Table E-1 complete? Please provide a confirmation statement if Table E-1 list is complete.

**RAI-SRXB-8: Anticipated Transient Without Scram (ATWS)**

To meet the requirements of 10 CFR 50, Appendix A, GDC 10 and 15 for assuring the design conditions with respect to the integrity of physical barriers, the completeness and accuracy requirements of 10 CFR 50.9, and the requirements for ATWS as specified in 10 CFR 50.62, "Requirements for reduction of risk from anticipated transients without scram (ATWS) events for light-water-cooled nuclear power plants," please provide information for the following:

For TSAR, Section 9.3.1, "Anticipated Transient Without Scram," please provide the CGS-specific ATWS analysis results at 100% Current Licensed Thermal Power (CLTP) and the margin of the ATWS acceptance criteria for the following:

- (a) PCT,
- (b) Peak clad oxidation and,
- (c) Peak containment pressure

**RAI-SRXB-9: Fuel Pool Cooling (FPC) System Parameters**

In the TSAR, Table 6.6, "FPC System Parameters," shows the comparison of FPC system data between CLTP and Thermal Power Optimization (TPO). To meet the requirements of 10 CFR 50.9, please provide responses to the following questions:

- (a) Please confirm the MWt values for CLTP and TPO.
- (b) Confirm that the data for all FPC system parameters for both CLTP and TPO are the same.

**RAI-SRXB-10: Station Blackout (SBO)**

Provide a confirmation of meeting the requirements in 10 CFR 50.63, "Loss of alternating current power," for the MUR power uprate. Specifically, please provide a description on if the plant has sufficient condensate inventory for MUR power uprate operation and whether the reactor core isolation cooling (RCIC) or high pressure coolant injection (HPCI) systems can provide core cooling and coverage during the SBO coping period.

**RAI-SRXB-11: Reactor Water Cleanup (RWCU) Line Break**

In the TSAR, Section 10.1.2.4, "RWCU System Line Breaks," clarify why and how the RWCU process temperature and enthalpy are decreased due to the MUR power uprate to meet the completeness and accuracy requirements of 10 CFR 50.9. Also, please provide the reference reactor power used for this comparison.

**RAI-SRXB-12: Reactor Vessel Fracture Toughness**

To meet the requirements of 10 CFR 50, Appendix A, GDC 10 and 15 for assuring the design conditions with respect to the integrity of physical barriers and the completeness and accuracy requirements of 10 CFR 50.9, please provide information for the following questions.

- (a) Please confirm that MUR power is used to define the 51.56 effective full power years (EFPY) in Table 3-1, "CGS Upper Shelf Energy 60-Year License (51.56 EFPY)."
- (b) In the TSAR, Section 3.2.1, "Fracture Toughness," it appears the same information has been provided in paragraphs (f) and (g) on Page 3-2 of the TSAR. Please confirm if any additional information was supposed to be presented in either paragraph.

Thank you,

**John Klos**

**DORL Callaway, Columbia Project Manager**

**U.S. NRC, Office of Nuclear Reactor Regulation,**

**Division of Operating Reactor Licensing, O8E7**

**NRC/NRR/DORL/LPL4-1, MS O8H4A**

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**Subject:** Re: RE: NON proprietary Request for Additional Information Regarding Columbia  
MUR Power Uprate (CAC No. MF8060)  
**Sent Date:** 1/4/2017 7:07:17 AM  
**Received Date:** 1/4/2017 7:07:17 AM  
**From:** Klos, John

**Created By:** John.Klos@nrc.gov

**Recipients:**  
"Klos, John" <John.Klos@nrc.gov>  
Tracking Status: None  
"Garcia, Richard M." <rmgarcia@energy-northwest.com>  
Tracking Status: None

**Post Office:** unknown

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