



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
WASHINGTON, D.C. 20555-0001

July 15, 2010

Mr. W.S. Oxenford, Vice President  
Nuclear Generation and Chief Nuclear Officer  
Columbia Generating Station  
Energy Northwest  
MD PE08  
P.O. Box 968  
Richland, WA 99352

SUBJECT: REQUEST FOR ADDITIONAL INFORMATION FOR THE REVIEW OF THE  
COLUMBIA GENERATING STATION, LICENSE RENEWAL APPLICATION

Dear Mr. Oxenford:

By letter dated January 19, 2010, Energy Northwest submitted an application pursuant to Title 10 of the *Code of Federal Regulations* Part 54 (10 CFR Part 54), to renew Operating License NPF-21 for Columbia Generating Station, for review by the U.S. Nuclear Regulatory Commission (NRC or the staff). The staff is reviewing the information contained in the license renewal application and has identified, in the enclosure, areas where additional information is needed to complete the review. Further requests for additional information may be issued in the future.

Items in the enclosure were discussed with Mr. Abbas Mostala and a mutually agreeable date for the response is within 30 days from the date of this letter. If you have any questions, please contact me at 301-415-4029 or by e-mail at [evelyn.gettys@nrc.gov](mailto:evelyn.gettys@nrc.gov).

Sincerely,

A handwritten signature in cursive script that reads "Evelyn Gettys".

Evelyn Gettys, Project Manager  
Projects Branch 1  
Division of License Renewal  
Office of Nuclear Reactor Regulation

Docket No. 50-397

Enclosure:  
As stated

cc w/encl: Distribution via Listserv

COLUMBIA GENERATING STATION  
LICENSE RENEWAL APPLICATION  
REQUEST FOR ADDITIONAL INFORMATION

**RAI B.2.A-1**

Request for Additional Information (RAI) for the Following Aging Management Programs (AMPs):

- B.2.12 ("Chemistry Program Effectiveness Inspection")
- B.2.14 ("Cooling Units Inspection")
- B.2.16 ("Diesel Starting Air Inspection")
- B.2.17 ("Diesel System Inspection")
- B.2.18 ("Diesel Driven Fire Pumps Inspection")
- B.2.27 ("Flexible Connection Inspection")
- B.2.30 ("Heat Exchangers Inspection")
- B.2.37 ("Lubricating Oil Inspection")
- B.2.41 ("Monitoring and Collection Systems Inspection")
- B.2.48 ("Service Air Inspection")
- B.2.51 ("Supplemental Piping/Tank Inspection")

Background

Under the program element "parameters monitored or inspected," the above applicant AMPs state that "inspections will be performed by qualified personnel using established NDE techniques." GALL Report AMP XI.M32 ("One-Time Inspection") states that inspections are to be performed by qualified personnel following procedures consistent with the requirements of the ASME Code and 10 CFR 50, Appendix B.

Issue

The above applicant AMPs do not specifically state that the inspections will be performed in conformance with the requirements of the ASME Code nor does the AMP or AMP basis document reference a site-specific procedure outlining the training requirements for individuals assigned to perform inspections in accordance with the above AMPs.

Request

Provide details regarding the training requirements for individuals assigned to perform the inspections described in the above AMPs. Describe how this training program is consistent with training requirements stipulated in the applicable ASME Code requirements.

**RAI B.2.A-2**

RAI for the Following AMPs:

- B.2.12 ("Chemistry Program Effectiveness Inspection")
- B.2.14 ("Cooling Units Inspection")
- B.2.16 ("Diesel Starting Air Inspection")

ENCLOSURE

- B.2.17 (“Diesel System Inspection”)
- B.2.18 (“Diesel Driven Fire Pumps Inspection”)
- B.2.27 (“Flexible Connection Inspection”)
- B.2.30 (“Heat Exchangers Inspection”)
- B.2.37 (“Lubricating Oil Inspection”)
- B.2.41 (“Monitoring and Collection Systems Inspection”)
- B.2.48 (“Service Air Inspection”)
- B.2.51 (“Supplemental Piping/Tank Inspection”)

Background

Under the “detection of aging effects” program element, the above applicant AMPs states that “a sample population will be determined by engineering evaluation based on sound statistical sampling methodology.” The GALL Report AMP XI.M32 (“One-Time Inspection”) states under this program element that “the inspection includes a representative sample of the system population, and where practical, focuses on the bounding or lead components most susceptible to aging due to time in service, severity of operating conditions, and lowest design margin.”

Issue

Although the above AMPs require the inspection of a representative sample of the material and environment combinations for systems within the scope of the program, they present no details of the proposed sampling plan and provide no assurance that a representative population of sufficient size and scope will be inspected.

Request

Describe the sampling methodology, including how the population for each of the material-environment-aging effect combinations is being selected, and what type of engineering, design, or operating experience considerations would be used to select the sample of components for both the scheduled and supplemental inspections.

**RAI B.2.49-1**

Background

A review of operating experience at Columbia Generating Station (CGS) has indicated that multiple failures of small-bore socket welds have occurred at CGS due to cracking.

Issue

GALL Report, Section XI.M35 recommends the use of the One-Time Inspection of ASME Code Class 1 small-bore piping only for those plants that have not experienced cracking of ASME Code Class 1 small-bore piping resulting from stress corrosion or thermal and mechanical loading. For those plants that have experienced cracking, the GALL Report recommends periodic inspection of the subject piping to be managed by a plant-specific AMP.

Request

Since cracking of socket welds has occurred at CGS, either provide a plant-specific AMP that includes periodic inspections to manage cracking, or provide justification why a plant-specific AMP that includes periodic inspections is not necessary for ASME Code Class 1 small-bore piping.

### **RAI B.2.26-3**

#### Background

Standard Review Plan-License Renewal (SRP-LR) Table 3.3-1, item 84 addresses copper alloy with >15% zinc piping, piping components, piping elements, and heat exchanger components exposed to raw water, treated water, or closed cycle cooling water, and recommends GALL AMP XI.M33, ("Selective Leaching of Materials Program") to manage loss of material due to selective leaching for these components. GALL AMP XI.M33 recommends managing selective leaching of components using a one-time visual inspection and hardness measurement of selected components to determine whether selective leaching is occurring. GALL AMP XI.M27, "Fire Water System Program," does not include activities to manage loss of material due to selective leaching.

License renewal application (LRA) Section B.2.26 states an enhancement to the "acceptance criteria" program element of its Fire Water System Program to include hardness testing, or equivalent, on its sprinkler heads as part of its NFPA testing in order to manage selective leaching. The sprinkler heads are constructed of copper alloy with >15% zinc.

#### Issue

GALL AMP XI.M33 states that if selective leaching is occurring, an engineering evaluation is initiated to determine acceptability of the affected components for further service. GALL AMP XI.M33 also states that, if necessary, the evaluation will include a root cause analysis. In its review of the "detection of aging effects" and "acceptance criteria" program elements described in LRA Section B.2.26 for the Fire Water System Program, and in its basis document, the staff noted that the AMP did not include any details regarding how to detect whether selective leaching has occurred or any acceptance criteria or follow-up evaluations that will be performed if selective leaching is identified.

#### Request

Describe how selective leaching of copper alloy with >15% zinc components will be detected by hardness testing or equivalent methods, and define the acceptance criteria and follow-up actions that will be implemented if selective leaching is identified as part of the activities performed in the Fire Water System Program.

### **RAI 3.3.2.2.13-1**

#### Background

GALL Report Section IX.F defines wear as follows: "Wear is defined as the removal of surface layers due to relative motion between two surfaces or under the influence of hard abrasive particles. Wear occurs in parts that experience intermittent relative motion, frequent manipulation, or in clamped joints where relative motion is not intended but may occur due to a loss of the clamping force." SRP-LR, Section 3.3.2.2.13, states that loss of material due to wear could occur in the elastomer seals and components exposed to air-indoor uncontrolled (internal or external). The GALL Report recommends further evaluation to ensure that these aging effects are adequately managed. Acceptance criteria are described in Branch Technical Position RLSB-1 (Appendix A.1 of this SRP-LR.)

LRA Section 3.3.2.2.13 refers to LRA Table 3.3.1, item 3.3.1-34, and addresses loss of material due to wear for elastomer seals and components exposed to air-indoor uncontrolled (internal or external). The applicant addressed the further evaluation criteria of the SRP-LR by stating that wear of elastomer seals and components exposed to air-indoor was not identified as an aging effect requiring management. The applicant also stated that loss of material due to wear is the result of relative motion between two surfaces in contact and wear occurs during the performance of an active function as a result of improper design, application or operation; or to a very small degree with insignificant consequences, and therefore, loss of material due to wear is not an aging effect requiring management for elastomers exposed to air-indoor uncontrolled.

Issue

The staff does not have sufficient information to determine that improper design, application or operation is not a factor resulting in loss of material due to wear in elastomeric components exposed to air-indoor uncontrolled.

Request

Provide justification why improper design, application or operation is not a factor resulting in the loss of material due to wear for elastomeric components exposed to an air-indoor uncontrolled environment, or provide an AMP to manage this aging effect.

**RAI 3.3.2.3-1**

Background

The GALL Report does not contain a recommended AMR line item for elastomers exposed to lubricating oil or fuel oil. However, in LRA Tables 3.3.2-20 and 3.3.2-22, the applicant stated that for elastomer flexible connections exposed to lubricating or fuel oil there is no aging effect and no AMP is proposed.

Issue

Resistance of natural rubber to lubricating or fuel oil is poor (P.A. Schweitzer, - Corrosion Resistance Tables – Metals, Nonmetals, Coatings, Mortars, Plastics, Elastomers and Linings, and Fabrics, Fifth Edition, Marcel Dekker, 2004). The staff does not have sufficient information to determine that there is no aging effect for this material/environment combination.

Request

Provide additional information (e.g., elastomer material type, fuel oil and lube oil composition) that would demonstrate that the plant-specific applications for the elastomer and fuel or lube oil environment does not have an aging effect requiring management during the extended period of operation or provide an AMP to manage any applicable aging effect.

**RAI 3.5.2.3-1**

Background

GALL Report Table III A6, Group 6 Structures (Water-Control Structures), line item III.A6-12 (TP-7) recommends that AMP XI.S6, (“Structures Monitoring Program”), should be used to manage the aging effects of loss of sealing/deterioration of seals, gaskets, and moisture barriers

(caulking, flashing, and other sealants) for elastomers exposed to various environments. In LRA Table 3.5.2-13, Bulk Commodities, Waterstops, the applicant stated that for elastomer waterstops exposed to air-indoor (within walls, floors, or foundation) there is no aging effect and no proposed AMP.

Issue

Continuous waterstops are provided in the reactor building at all horizontal and vertical construction joints in exterior walls and interior walls between and including the top of the foundation mat. High temperature and radiation could exist in the reactor building walls, floors, and foundation mat, and could cause hardening and loss of strength for the elastomer components. The staff does not have sufficient information to determine that there is no aging effect for this material/environment combination.

Request

Provide justification why hardening and loss of strength due to elastomer degradation for elastomer waterstops exposed to air-indoor (within walls, floors, or foundation) is not considered an aging effect requiring aging management.

**Time Limited Aging Analysis (TLAA)**

**RAI 4.2.1-1**

Background

Regulatory Guide 1.190, "Calculational and Dosimetry Methods for Determining Pressure Vessel Neutron Fluence," states that the core neutron source should be determined by the power distribution, the power level, and the fuel management scheme.

Issue

LRA Section 4.2.1 states that 54 effective full power year (EFPY) fluence values were extrapolated from 51.6 EFPY fluence values.

Request

Please confirm that the flux used for this extrapolation was that assumed for post-Cycle 11, uprated operation. If it is not, please provide the basis for the assumed flux value and justify its use.

July 15, 2010

Mr. W.S. Oxenford, Vice President  
Nuclear Generation and Chief Nuclear Officer  
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MD PE08  
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Sincerely,  
*/RA/*  
Evelyn Gettys, Project Manager  
Projects Branch 1  
Division of License Renewal  
Office of Nuclear Reactor Regulation

Docket No. 50-397

Enclosure:  
As stated

cc w/encl: Distribution via Listserv

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Letter to W.S. Oxenford from Evelyn H. Gettys dated July 15, 2010

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