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

December 3, 2010

Mr. S. K. Gambhir
Vice President Technical Services
Columbia Generating Station
Energy Northwest
MD PE04
P.O. Box 968
Richland, WA 99352-0968

SUBJECT: REQUEST FOR ADDITIONAL INFORMATION FOR THE REVIEW OF THE COLUMBIA GENERATING STATION, LICENSE RENEWAL APPLICATION (TAC NO. ME3058)

Dear Mr. Gambhir:

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 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.

Sincerely,

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

Omesh–
RAI 3.1.2.2.1-01

Background:
In LRA Table 3.1.1, in addition to the fatigue assessment of pressure vessel support skirt and attachment welds, the applicant used Item 3.1.1-01 for the pressure boundary bolting exposed to air. The applicant added that the effect of cracking due to fatigue of pressure boundary bolting is managed by the Bolting Integrity Program. The staff noted that there are two rows: LRA Table 3.1.2-1 Row 320 and LRA Table 3.1.2-3 Row 8, which are associated with Table 3.1.1 Item 3.1.1-01. Both rows represent pressure boundary steel bolting exposed to uncontrolled indoor air, and the aging effect of cracking due to fatigue is managed by the Bolting Integrity Program. Also, both rows cite generic note E, indicating that the material, environment, and aging effect is consistent with the GALL Report but a different aging management program is credited.

Issue:
GALL Report Vol. 1, Table 1, Line ID 1, specifically relates a fatigue TLAA to managing the aging effect of fatigue. The staff noted that the Fatigue Monitoring Program is the aging management method recommended under the GALL Report item to manage the aging effect of metal fatigue, and any other option such as a comprehensive inspection needs to be evaluated on a case-by-case basis.

It is not clear to the staff which closure bolting is represented in the LRA line items, Row Numbers 320 and 8. These two rows included in the LRA indicate that cracking due to fatigue will be managed by the Bolting Integrity Program. It is not clear to the staff if the cited generic note E is appropriate as the GALL Report Vol. 1, Table 1, Line IDs 1 and 4 specifically recommend fatigue TLAA to manage aging effect of fatigue.

The staff also reviewed LRA Section 4.3 and noted that a TLAA associated with pressure boundary bolting was not specifically identified. The staff further noted that LRA Section 4.3 does not address a disposition of TLAA in accordance with 10 CFR 54.21(c)(1)(iii), that the effects of aging will be managed by the Bolting Integrity Program.

Furthermore, the staff noted that air-indoor uncontrolled is listed in the "Environment" column for Rows 324 and 312 of LRA Table 3.1.2-1 and both rows cite GALL Report Item IV.A1-7 in the "NUREG-1801 Volume 2 Item" column. However, the staff noted that reactor coolant is listed in "Environment" for the GALL Report Item IV.A1-7.

Request:
(1) Clarify what specific bolting in the reactor pressure vessel and reactor coolant pressure boundary are represented in Table 3.1.2-1 Row 320 and Table 3.1.2-3 Row 8, respectively.

(2) Clarify and justify how the cracking due to fatigue of pressure boundary bolting can be adequately managed by the Bolting Integrity Program. This justification, at a minimum, should include a demonstration that the Bolting Integrity Program is effective to manage fatigue cracking of metal bolts of the reactor coolant pressure boundary caused by anticipated cyclic strains in the material. Justify that generic note E is appropriate for both Row 320 of Table 3.1.2-1 and Row 8 of Table 3.1.2-3.

(3) Justify why a TLAA in LRA Section 4.3 associated with closure bolting does not need to be identified and why LRA Section 4.3 does not need to address a TLAA disposition, in accordance with 10 CFR 54.21(c)(1)(iii), that the effects of aging will be managed by the Bolting Integrity Program is not required.

(4) Justify that generic note A is appropriate for both AMR line items, Rows 324 and 312 of Table 3.1.2-1, which cite GALL Report Vol.2 Item IV.A1-7, but designated air-indoor uncontrolled as the environment.

Omesh
Follow up question to RAI 4.3-02

Background:

In the response to RAI 4.3-02 (dated August 26, 2010) the applicant stated that the original equipment manufacturer (OEM) stress report for the Columbia reactor vessel calculated a CUF for the CRD penetrations but did not include the incore housing penetration. These penetrations were evaluated in a generic stress report. The applicant stated that since this is a generic analysis and not a Columbia-specific analysis, it is not considered a Columbia CUF of record and thus is not a TLAA. The applicant also stated that Columbia listed the generic incore penetration CUF analysis in earlier versions of the basis documents upon which the LRA was based, but deleted it because it was not a plant-specific analysis. Unfortunately reference to the CUF for the incore housing penetrations was not also deleted from Appendix C, Table C-8; the applicant stated that it will be amended in response to this RAI to correct this oversight.

Issue:

The applicant has listed the generic incore penetration CUF analysis in the earlier versions of the basis documents but did not provide any other details regarding the analysis. Furthermore, LRA Table 3.1.2-1 presents the AMR results for reactor pressure vessel and includes TLAA line item 3.1.1-02 for CRD housing and stub tube in rows 246 and 253, respectively, and incore housing in row 259, indicating that a TLAA for the incore housing is included in Columbia design basis documents. If the generic incore penetration CUF analysis was included in the design basis document, it is not clear to the staff why it was later deleted from the basis documents. The applicant did not provide a justification or technical basis for this action.

Request:

Since fatigue CUF analyses for the CRD housing, CRD stub tubes, and incore housing penetrations are identified as TLAAs in the initial design basis documents and in the plant-specific response to BWRVIP applicant action items in LRA Appendix C, either (a) provide the

reference of the fatigue CUF analysis and resultant CUF values for the incore housing penetrations or (b) provide a technical basis why the analysis does not conform to the definition of a TLAA and can be deleted from Appendix C, Table C-8.

Omesh
Follow up question to RAI Cumulative Fatigue Damage AMR

Background:

In the response to RAI Cumulative Fatigue Damage AMR (dated August 26, 2010), the applicant stated that Columbia opted not to list fatigue TLAA of non-Class 1 components in the Section 3.2 tables because they are not managed by an Aging Management Program. As stated in LRA Section 4.3.4, all non-Class 1 components were reviewed as part of the Aging Management Review process. For non-Class 1 components, fatigue evaluation is accomplished by utilization of a stress range reduction factor. The applicant stated that these fatigue analyses of non-Class 1 components remain valid through the extended period of operation because none of the Columbia systems will reach the analyzed 7000 full range expansion cycles. The applicant added that since there is no implicit/explicit fatigue analysis, there is no fatigue aging effect for non-Class 1 components. The applicant stated that in either case there is no fatigue managed by a GALL AMP.

Issue:

10 CFR 54.21(a)(1) requires that the license renewal application to identify and list those components subject to an aging management review. As stated in LRA Section 4.3.4, all non-Class 1 components are part of the Aging Management Review. Therefore, LRA Tables 3.2.2-X, 3.3.2-X, and 3.4.2-X should include all components associated with AMR items related to TLAA for managing cumulative fatigue damage of non-Class 1 components.

Request:

Justify that LRA Tables 3.2.2-X, 3.3.2-X, and 3.4.2-X do not need to identify and list all the AMR results, which include the components associated with a TLAA for managing cumulative fatigue damage of non-Class 1 components, that are in scope of license renewal in accordance with 10 CFR 54.4 and are subject to an AMR in accordance with 10 CFR 54.21(a)(1).

Holston
RAI B.2.A-3

Background:

GALL AMP XI.M32, "One-Time Inspection" states in element 4, "detection of aging effects" 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.

Columbia has several programs which are consistent with GALL AMP XI.M32, including the Chemistry Program Effectiveness Inspection, Cooling Units Inspection, Diesel Starting Air Inspection, Diesel Systems Inspection, Diesel Driven Fire Pumps Inspection, Flexible Connection Inspection, Heat Exchangers Inspection, Lubricating Oil Inspection, Monitoring and Collection Systems Inspection, Service Air Inspection, and Supplemental Piping/Tanks Inspection Programs. In the LRA, each one-time inspection program has a statement similar to the following: "The sample population will be determined by engineering evaluation based on sound statistical sampling methodology, and, where practical, will be focused on the components most susceptible to aging, such as due to their time in service, the severity of conditions during normal plant operation, and the lowest design margins."

In its response to RAI B.2.A-2 dated October 13, 2010, the applicant stated that the components selected for inspection as part of its one-time inspection programs will be those most susceptible to aging effects as defined by time in service, severity of operating conditions, and design margins. The applicant provided a flow chart that described how the sample size would be selected based on the discrete number of components in the population. The chart stated that 5% of the components would be inspected for a population size of 21 – 200 components, a minimum sample size of 1 component would be inspected for populations of less than 20, and a maximum sample size of 10 components would be inspected for populations over 200.

Issue:

Due to the uncertainty in determining the most susceptible locations and the potential for aging to occur in other locations, the staff noted that large sample sizes (at least 20%) may be required in order to adequately confirm an aging effect is not occurring. It is unclear to the staff how the sample sizes outlined in the response to RAI B.2.A-2 are adequate to provide confidence that the remaining population of components that are not inspected are not experiencing degradation.

Request:

Provide technical justification for the adequacy of the sample sizes chosen at ensuring that the components not inspected are not experiencing degradation.

Holston
RAI B.2.47-1

Background:

GALL AMP XI.M33, "Selective Leaching of Materials" states in element 1, "scope of program" that the program includes a one-time visual inspection and hardness measurement of a selected set of sample components to determine whether loss of material due to selective leaching is not occurring for the period of extended operation.

LRA Section B.2.47, Selective Leaching Inspection, states that the program includes (a) determination of the sample size based on an assessment of materials of fabrication, environment and conditions, and operating experience; and (b) identification of the inspection locations in the susceptible system or component.

Issue:

Due to the uncertainty in determining the most susceptible locations and the potential for aging to occur in other locations, the staff noted that large sample sizes (at least 20%) may be required in order to adequately confirm an aging effect is not occurring. The applicant's Selective Leaching Inspection Program did not include specific information regarding how the selected set of components to be sampled or the sample size will be determined.

Request:

Provide specific information regarding how the selected set of components to be sampled will be determined and the size of the sample of components that will be inspected.

December 3, 2010

Mr. S. K. Gambhir
Vice President Technical Services
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/RA/
Evelyn Gettys, Project Manager
Projects Branch 1
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Docket No. 50-397

Enclosure:
As stated

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Letter to S.K. Gambhir from E. Gettys dated December 3, 2010.

SUBJECT: REQUEST FOR ADDITIONAL INFORMATION FOR THE REVIEW OF THE COLUMBIA GENERATING STATION, LICENSE RENEWAL APPLICATION (TAC NO. 3058)

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