



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

November 1, 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,

A handwritten signature in cursive script, reading "Evelyn H. Gettys", is positioned above the typed name.

Evelyn H. 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**

Holston OTI vs periodic program

RAI 3.2.2.1.Y-1

Background

License Renewal Application (LRA) Table 3.3.1, Item 3.3.1-58 addresses external steel piping and pump surfaces exposed to air-indoor uncontrolled, which are being managed for loss of material due to general corrosion. The LRA credits the External Surfaces Monitoring Program to manage the aging effects for the air-indoor uncontrolled environment. In LRA Tables 3.3.2-9, Containment Vacuum Breaker System, 3.3.2-21, Equipment Drains Radioactive Systems, and 3.3.2-24, Floor Drain Radioactive System, for piping, and LRA Tables 3.3.2-22, Fire Protection System, 3.3.2-42, Standby Service Water System, and 3.3.2-43, Tower Makeup Water System, for pump casings, the applicant cites plant-specific Note 303 which states, "The Supplemental Piping/Tank Inspection will manage loss of material at the air-water interface." The Generic Aging Lessons Learned (GALL) Report recommends GALL aging management program (AMP) XI.M36 "External Surfaces Monitoring" program to ensure that these aging effects are adequately managed. The associated aging management review (AMR) line items cite generic Note E.

Issue

The staff noted that the applicant's plant-specific Note 303 is not clear on whether only the Supplemental Piping and Tank Inspection Program will be utilized or if it will be utilized in conjunction with the External Surfaces Monitoring Program for external surfaces at the air-water interface zone. The staff also noted that the Supplemental Piping and Tank Inspection Program is a one-time inspection program, where the GALL AMP XI.M36 is based on periodic inspections.

Request

1. State whether the external surfaces within the air-water interface will be inspected by both the Supplemental Piping and Tank Inspection and External Surfaces Monitoring Programs.
2. If only the Supplemental Piping and Tank Inspection Program will be utilized, justify why a one-time inspection program is acceptable when the GALL Report recommends a periodic inspection program.

RAI B.2.17-1

Background

GALL AMP XI.M32 states that use of a one-time inspection is appropriate when: (a) an aging effect is not expected to occur but the data is insufficient to rule it out with reasonable confidence; (b) an aging effect is expected to progress very slowly in the specified environment,

ENCLOSURE

but the local environment may be more adverse than that generally expected; or (c) the characteristics of the aging effect include a long incubation period. GALL AMP XI.M32 also states that for these cases, the one-time inspection should provide confirmation that either the aging effect is indeed not occurring, or the aging effect is occurring very slowly so as not to affect the component or structure's intended function during the period of extended operation.

The GALL Report Table VII.H2, Item VII.H2-2 states that steel piping, piping components, and piping elements exposed to diesel exhaust can undergo loss of material and recommends a plant-specific AMP.

Issue

The LRA Table 3.3.2-16, Row Numbers 14, 27, 32 and 38, refers to the above item and cites generic Note E and plant-specific Note 0322, which states that the environment is predominantly outdoor air with infrequent, and for short duration, exposure to diesel exhaust. The applicant credited the Diesel Systems Inspection Program as the AMP to manage this aging effect. However, it is not clear to the staff how the Diesel System Inspection Program, which is a one-time inspection program, will appropriately manage aging of this component, because the recommended GALL AMP would include periodic inspections to detect the associated aging effect.

Request

Justify how the one-time inspections proposed by the Diesel Systems Inspection Program are adequate to manage loss of material for steel components exposed internally to outdoor air by explaining how, for each component managed by the program, one of the following criteria for use of a one-time inspection is satisfied: (a) the aging effect is not expected to occur but the data is insufficient to rule it out with reasonable confidence; (b) the aging effect is expected to progress very slowly in the specified environment, but the local environment may be more adverse than that generally expected; or (c) the characteristics of the aging effect include a long incubation period.

RAI B.2.18-1

Background

GALL AMP XI.M32 states that use of a one-time inspection is appropriate when: (a) an aging effect is not expected to occur but the data is insufficient to rule it out with reasonable confidence; (b) an aging effect is expected to progress very slowly in the specified environment, but the local environment may be more adverse than that generally expected; or (c) the characteristics of the aging effect include a long incubation period. GALL AMP XI.M32 also states that for these cases, the one-time inspection should provide confirmation that either the aging effect is indeed not occurring, or the aging effect is occurring very slowly so as not to affect the component or structure's intended function during the period of extended operation.

In LRA Section B.2.18, the applicant stated that its Diesel-Driven Fire Pump Inspection Program will be used to identify loss of material in the interior of the fire protection system diesel engine

steel exhaust piping exposed to outdoor air and the copper alloy, gray cast iron (steel), and stainless steel heat exchangers exposed to raw water (antifreeze). The applicant also stated that the inspection checks for reduction in heat transfer and cracking due to stress corrosion cracking of susceptible materials.

GALL Report Item VIII.B1-6 recommends GALL AMP XI.M38, "Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components" to manage loss of material for steel piping exposed internally to outdoor air. GALL AMP XI.M38 includes periodic inspections of the internal surfaces of components to manage loss of material. GALL Report Items VII.C1-3, VII.C1-5, and V.A-8 recommend GALL AMP XI.M20, "Open Cycle Cooling Water" to manage loss of material for copper alloy, steel, and stainless steel heat exchanger components, respectively. GALL AMP XI.M20 includes periodic inspections, surveillance testing, and water chemistry controls to manage loss of material and reduction of heat transfer. The GALL Report for copper alloy, steel, and stainless steel components exposed to raw water recommend GALL AMP XI.M27, "Fire Water System" to manage loss of material. GALL AMP XI.M27 also recommends periodic inspections and surveillance testing to manage loss of material and fouling.

Issue

It is not clear to the staff how a one-time inspection program is appropriate to manage loss of material and reduction of heat transfer for these material and environment combinations given that: (a) loss of material is expected to occur for steel piping exposed to outdoor air; (b) loss of material and reduction in heat transfer is expected to occur for copper alloy, steel, and stainless steel heat exchanger components exposed to raw water; (c) the GALL Report recommends periodic inspection programs to manage aging for these material and environment combinations; and (d) a one-time inspection program is only to be used when an aging effect is not expected or is expected to progress very slowly.

Request

Justify how the one-time inspections proposed by the Diesel-Driven Fire Pump Inspection Program are adequate to manage loss of material and reduction of heat transfer for copper alloy, steel, and stainless steel components exposed internally to outdoor air or raw water by explaining how, for each component managed by the program, one of the following criteria for use of a one-time inspection is satisfied: (a) the aging effect is not expected to occur but the data is insufficient to rule it out with reasonable confidence; (b) the aging effect is expected to progress very slowly in the specified environment, but the local environment may be more adverse than that generally expected; or (c) the characteristics of the aging effect include a long incubation period.

RAI B.2.48-1

Background

The GALL AMP XI.M32 states that use of a one-time inspection is appropriate when: (a) an aging effect is not expected to occur but the data is insufficient to rule it out with reasonable confidence; (b) an aging effect is expected to progress very slowly in the specified environment,

but the local environment may be more adverse than that generally expected; or (c) the characteristics of the aging effect include a long incubation period. GALL AMP XI.M32 also states that for these cases, the one-time inspection should provide confirmation that either the aging effect is indeed not occurring, or the aging effect is occurring very slowly so as not to affect the component or structure's intended function during the period of extended operation.

In LRA Section B.2.48, the applicant stated that its Service Air System Inspection Program will be used to identify the material condition of piping and valve bodies exposed to an internal air environment. The applicant also stated that the inspection checks for loss of material due to general corrosion.

The GALL Report recommends GALL AMP XI.M38, "Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components" Program to manage loss of material for steel piping exposed internally to air. GALL AMP XI.M38 includes periodic inspections of the internal surfaces of components to manage loss of material.

Issue

It is not clear to the staff how a one-time inspection program is appropriate to manage loss of material for these material and environment combinations given that: (a) loss of material is expected to occur for steel piping exposed internally to air; (b) the GALL Report recommends periodic inspection programs to manage aging for these material and environment combinations; and (c) a one-time inspection program is only to be used when an aging effect is not expected or is expected to progress very slowly.

Request

Justify how the one-time inspections proposed by the Service Air System Inspection Program are adequate to manage loss of material for steel components exposed internally to air by explaining how, for each component managed by the program, one of the following criteria for use of a one-time inspection is satisfied: (a) the aging effect is not expected to occur but the data is insufficient to rule it out with reasonable confidence; (b) the aging effect is expected to progress very slowly in the specified environment, but the local environment may be more adverse than that generally expected; or (c) the characteristics of the aging effect include a long incubation period.

Spent Fuel Pool

RAI B.2.54-1

Background

Standard Review Plan for Review of License Renewal Applications for Nuclear Power Plants (SRP-LR) Section A.1.2.3.1, states that the scope of the program should include the specific structures and components of which the program manages the aging.

In addition, SRP-LR Section A.1.2.3.4, states that detection of aging effects should occur before there is a loss of the structure and component intended functions. The parameters to be

monitored or inspected should be appropriate to ensure that the structure and component intended functions will be adequately maintained for license renewal under all current licensing basis design conditions. This includes aspects such as method or technique (e.g., visual, volumetric, surface inspection), frequency, sample size, data collection and timing of new or one-time inspections to ensure timely detection of aging effects.

In its response dated August 19, 2010, the applicant states that the Boron Carbide Monitoring Program detects degradation of boron carbide (B_4C) neutron absorbers in the spent fuel storage racks by B_4C coupon inspection. The applicant further stated that boron loss is determined through measurement of the boron areal density (i.e., neutron attenuation testing) in the coupons. In addition, per the corrective action program, the applicant also indicated that *in situ* areal measurement density techniques such as Boron-10 Areal Density Gauge for Evaluating Racks (BADGER) testing may be performed to determine boron loss.

Issue

LRA Section B.2.54 does not indicate the location and number of B_4C coupons used in the Boron Carbide Monitoring Program and whether or not coupon inspection will be performed in the period of extended operation. Furthermore, the applicant indicated that neutron attenuation testing will be performed, but the frequency of testing was not stated.

Request

1. Indicate the number of B_4C coupons available for use for the Boron Carbide Monitoring Program.
 - a. Discuss the number of coupons inspected during each inspection and whether coupon inspection will be performed throughout the period of extended operation.
 - b. Provide past inspection test results for the coupons, including boron areal density measurements.
2. Provide the frequency for which neutron attenuation testing, either *in situ* or coupons, will be performed during the period of extended operation.
3. Discuss the location, neutron flux, and mounting of the sample coupons relative to the fuel assemblies.
 - a. If the coupons are at a location of low neutron flux they will not be representative or bounding of the higher flux racks in the pool. As such, discuss how the loss of material and reduction of neutron absorbing capacity in the racks will be monitored or inspected.
 - b. Guidance on an acceptable program is available in License Renewal Interim Staff Guidance (LR-ISG) 2009-01, "Aging Management of Spent Fuel Pool Neutron-Absorbing Materials other than Boraflex." Describe how your program is consistent with LR-ISG-2009-01.

4. Provide the associated license renewal final safety analysis report supplement and commitment to perform this program in the period of extended operation.

November 1, 2010

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Sincerely,

/RA/

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

Docket No. 50-397

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As stated

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