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LR-N10-0265

U.S. Nuclear Regulatory Commission  
ATTN: Document Control Desk  
Washington, DC 20555-0001

Hope Creek Generating Station  
Facility Operating License No. NPF-57  
NRC Docket No. 50-354

Subject: Response to NRC Request for Additional Information, dated June 25, 2010,  
Related to Open Cycle Cooling Water System Program and Structures of the  
Hope Creek Generating Station License Renewal Application

Reference: Letter from Ms. Bennett Brady (USNRC) to Mr. Thomas Joyce (PSEG Nuclear,  
LLC) "REQUEST FOR ADDITIONAL INFORMATION FOR THE REVIEW OF  
THE HOPE CREEK GENERATING STATION LICENSE RENEWAL  
APPLICATION FOR OPEN CYCLE COOLING WATER SYSTEM PROGRAM  
AND STRUCTURES (TAC'NO. ME1832)", dated June 25, 2010

In the referenced letter, the NRC requested additional information related to Open Cycle  
Cooling Water System Program and Structures of the Hope Creek Generating Station License  
Renewal Application (LRA). Enclosed is the response to this request for additional information.

There are no new or revised regulatory commitments contained in this letter.

If you have any questions, please contact Mr. Ali Fakhar, PSEG Manager - License Renewal, at  
856-339-1646.

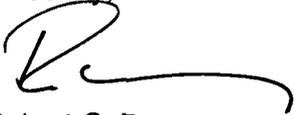
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I declare under penalty of perjury that the foregoing is true and correct.

Executed on 7/20/10

Sincerely,



Robert C. Braun  
Senior Vice President Nuclear  
PSEG Nuclear LLC

Enclosure: Response to Request for Additional Information

cc: S. Collins, Regional Administrator – USNRC Region I  
B. Brady, Project Manager, License Renewal – USNRC  
R. Ennis, Project Manager - USNRC  
NRC Senior Resident Inspector – Hope Creek  
P. Mulligan, Manager IV, NJBNE  
L. Marabella, Corporate Commitment Tracking Coordinator  
T. Devik, Hope Creek Commitment Tracking Coordinator

**Enclosure**

**Response to Request for Additional Information related to the Hope Creek Generating  
Station License Renewal Application**

RAI 3.5.2.1-7  
RAI 3.5.2.2.2-3

Note: For clarity, portions of the original LRA text are repeated in this Enclosure. Added text is shown in ***Bold Italics***, and deletions are shown with strikethrough text.

**RAI 3.5.2.1-7**

**Background:**

Standard Review Plan (SRP) Table 3.5-1, Item Number 3.5.1-50, credits the Generic Aging Lessons Learned (GALL) Report aging management program (AMP) XI.S6, Structures Monitoring Program, for managing loss of material due to pitting and crevice corrosion in an air-outdoor environment for galvanized steel, aluminum and stainless steel. The GALL Report AMP recommends general visual inspections with a 5 year frequency.

**Issue:**

In license renewal application (LRA) Table 3.3.2-27, the applicant references Item 3.5.1-50 and credits the Open-Cycle Cooling Water System Program to manage aging for stainless steel external surfaces of pump casings and rupture disks in an air-outdoor environment. The Open-Cycle Cooling Water System is an existing program that manages the internal corrosion of piping. It is not clear to the staff that the external surfaces of the components are in the scope of the Open-Cycle Cooling Water System Program. The staff is also unclear how the credited AMP meets or exceeds the GALL Report recommended program, and how the Open-Cycle Cooling Water System Program will be utilized to address the component/aging effect combinations during the period of extended operation.

**Request:**

Verify that the Open-Cycle Cooling Water System Program will manage the external surfaces of the stainless steel pump casings and rupture disks for loss of material. Also describe how the credited AMP meets or exceeds the GALL Report recommended program. Include a description of the inspection frequency and the inspection techniques.

**PSEG Response:**

The following Summary of Aging Management Evaluation Tables reference LRA Table 3.5.1 Item 3.5.1-50 (NUREG-1801 Volume 2 Item III.B2-7) and credit the Open-Cycle Cooling Water (OCCW) aging management program (Hope Creek LRA Appendix B.2.1.13) to manage aging for pump casings and ruptures disks made of stainless steel in an "Air - Outdoor (External)" environment:

- Table 3.3.2-27, Service Water System

The LRA Table 3.5.1 Discussion column for Item 3.5.1-50 addresses how this GALL item was used, including a statement of consistency with GALL. The first paragraph of the discussion addresses where the Structures Monitoring Aging Management program (Hope Creek LRA Appendix B.2.1.32) is credited, consistent with GALL.

As stated in the second paragraph of the Discussion column, this GALL item was also aligned to components in various Auxiliary Systems (including the Service Water System) based on material, environment and aging effect. This alignment follows from the definition of the referenced Standard Note E, which can apply when a LRA line item is consistent with the

NUREG-1801 item for material, environment and aging effect but a different aging management program is credited. This alignment was intended to show agreement between the LRA and GALL, with respect to the identified aging effects and mechanisms for the material and environment combination. This alignment was not intended to suggest consistency with the aging management program recommended by GALL for this item.

In this case, the recommended GALL program is not applicable for aging management of stainless steel pump casings or ruptures disks. The recommended GALL program and associated aging management activities, including surveillance and preventive measures, are specifically applicable to support members; welds; bolted connections; support anchorage to building structure, and include aging management activities that are effective in maintaining the structural integrity intended function associated with the components. This program does not include activities that will effectively manage aging effects of pump casings and rupture disks to assure the associated pressure integrity intended function is maintained.

The Hope Creek Service Water pump casings are composed of stainless steel. The external surfaces above the water level are exposed to outdoor air. There are no specific NUREG-1801 Volume 2 line items for stainless steel in outdoor air for mechanical systems. As shown in Table 3.3.2-27 of the LRA, on page 3.3-266, the OCCW aging management program will be used to manage loss of material on the external surface of the stainless steel pump casing material exposed to an outdoor air environment. The areas of the stainless steel pump casings that are exposed to an outdoor air environment are inaccessible during normal operation and cannot be observed during regular system walk downs, since they are below the floor level in the Service Water Intake Structure.

As described in the Hope Creek OCCW program, LRA Appendix B, Section B.2.1.13, the program includes component preventive maintenance activities for managing loss of material. The OCCW program can adequately identify and manage loss of material on both the internal and external surfaces of the Service Water pumps for the listed material, since the program includes periodic pump maintenance activities as part of the Generic Letter 89-13 Program. The Service Water pumps are pulled out of their installed position once every ten years as part of the regular maintenance program, and sent to the pump vendor for refurbishment. The preventive maintenance activities for the Service Water pumps include visual inspection of the external surfaces of the stainless steel pump casings. The OCCW program includes maintenance implementing documents for aging management of these components. The program includes condition-monitoring activities to detect loss of material during pump refurbishment, including visual inspection for:

- Corrosion and corrosion byproducts
- Coating degradation (e.g.; blistering and peeling)
- Discoloration
- Scale/deposits
- Pits
- Surface discontinuities

Visual inspection results that indicate loss of material in excess of minor surface corrosion are entered into the corrective action process for further evaluation by the engineering staff. The program also provides qualification requirements for personnel performing visual inspection

activities, in accordance with site-controlled procedures and processes. These program maintenance activities are capable of managing loss of material for the stainless steel pump casing surfaces exposed to an outdoor air environment. For the stainless steel pump casing within the scope of the OCCW program, visual inspections will detect loss of material prior to the loss of system intended function.

Similarly the OCCW program is credited for managing the aging effects of the Service Water System stainless steel rupture disks in outdoor air environment. There are no specific NUREG-1801 Volume 2 line items for stainless steel in outdoor air for mechanical systems. As shown in Table 3.3.2-27 of the LRA, on page 3.3-267, the OCCW program will be used to manage loss of material on the external surface of the stainless steel rupture disks material exposed to an outdoor air environment.

The Hope Creek Service Water System stainless steel rupture disks have periodic maintenance activities performed on the every five years in accordance with routine repetitive tasks. These repetitive tasks are credited by OCCW program for the management of internal and external aging mechanisms. For the stainless steel rupture disks within the scope of the OCCW program, periodic maintenance will prevent loss of material prior to the loss of system intended function.

**RAI 3.5.2.2.2-3**

**Background:**

SRP Section 3.5.2.2.2.5 states that cracking due to stress corrosion cracking and loss of material due to pitting and crevice corrosion could occur for Group 7 and 8 stainless steel tank liners. GALL Report structure Groups 7 and 8 refer to concrete tanks and missile barriers, and steel tanks and missile barriers, respectively.

**Issue:**

In LRA Section 3.5.2.2.2.1 and 3.5.2.2.2.5, the applicant states that Group 7 and 8 structures do not exist at Hope Creek Generating Station (HCGS). However, there are multiple tanks, such as the fire water storage tanks or the condensate storage tank, within the scope of license renewal and requiring an aging management review (AMR). The staff is unclear how there can be no Group 7 or 8 structures at HCGS.

In addition, in LRA Table 3.5.2-8, several AMR lines refer to the component "skimmer surge tank liner." This appears to be a stainless steel lined concrete tank. The staff is unclear why the guidance of SRP Section 3.5.2.2.2.5 would not apply to this component.

**Request:**

1. Explain why the in-scope tanks at Hope Creek are not considered part of GALL Report Group 7 or 8 structures. If the tanks are within either of these groups, explain how the aging effects discussed in SRP Sections 3.5.2.2.2.1 and 3.5.2.2.2.5 will be managed during the period of extended operation.
2. Explain why the guidance of SRP Section 3.5.2.2.2.5 does not apply to the "skimmer surge tank."

**PSEG Response:**

1. Hope Creek has no concrete tanks with stainless steel liners (Group 7 Structures) or tanks having concrete or structural steel members with stainless steel liners (Group 8 Structures) exposed to standing water in-scope of license renewal. Stainless steel and steel tanks that are in-scope of license renewal are addressed as components of the applicable mechanical system. For example the fire water storage tanks are included in LRA Table 3.3.2-10 (Fire Protection System), on page 3.3-191, and the condensate storage tank is included in LRA Table 3.4.2-1 (Condensate Storage and Transfer System), on page 3.4-36. Tank supports for components that are not within the scope of ASME Section XI, Subsection IWF, are managed as part of the enhanced Structures Monitoring Program. The Structures Monitoring Program implementing procedure for the inspections of component supports will be revised to reflect the enhancements as noted in LRA Appendix A, Section A.2.1.32, Item 1.o, on page A-26.

The intent of the discussion in LRA Sections 3.5.2.2.2.1 and 3.5.2.2.2.5 was to indicate Hope Creek does not have any components evaluated in Group 7 and 8 structures, and therefore the associated GALL items are not applicable. To provide this clarification the Hope Creek LRA Sections 3.5.2.2.2.1, 3.5.2.2.2.5 and Table 3.5.1 are revised as shown

below. Note that new information is displayed in bolded, italicized text and strikethrough for deleted text.

#### 3.5.2.2.2.1 Aging of Structures Not Covered by Structures Monitoring Program

*The GALL Report recommends further evaluation of certain structure/aging effect combinations if they are not covered by the structures monitoring program. This includes (1) cracking, loss of bond, and loss of material (spalling, scaling) due to corrosion of embedded steel for Groups 1-5, 7, 9 structures; (2) increase in porosity and permeability, cracking, loss of material (spalling, scaling) due to aggressive chemical attack for Groups 1-5, 7, 9 structures; (3) loss of material due to corrosion for Groups 1-5, 7, 8 structures; (4) loss of material (spalling, scaling) and cracking due to freeze-thaw for Groups 1-3, 5, 7-9 structures; (5) cracking due to expansion and reaction with aggregates for Groups 1-5, 7-9 structures; (6) cracks and distortion due to increased stress levels from settlement for Groups 1-3, 5-9 structures; and (7) reduction in foundation strength, cracking, differential settlement due to erosion of porous concrete subfoundation for Groups 1-3, 5-9 structures. The GALL Report recommends further evaluation only for structure/aging effect combinations that are not within the structures monitoring program.*

*Lock up due to wear could occur for Lubrite® radial beam seats in BWR drywell, RPV support shoes for PWR with nozzle supports, steam generator supports, and other sliding support bearings and sliding support surfaces. The existing program relies on the structures monitoring program or ASME Section XI, Subsection IWF to manage this aging effect. The GALL Report recommends further evaluation only for structure/aging effect combinations that are not within the ISI (IWF) or structures monitoring program.*

At Hope Creek, the Structures Monitoring Program, B.2.1.32 is used to manage aging affects applicable to Groups 1, 3, and 4 structures as discussed below. Group 5, "Fuel Storage Facility", is included with Group 1 structures. The GALL Groups 2, 7, 8, and 9 structures do not exist at Hope Creek. **Groups 7 and 8 structures components have been evaluated in other GALL Groups with the associated structure.**

#### 3.5.2.2.2.5 Cracking due to Stress Corrosion Cracking and Loss of Material due to Pitting and Crevice Corrosion

*Cracking due to stress corrosion cracking and loss of material due to pitting and crevice corrosion could occur for Group 7 and 8 stainless steel tank liners exposed to standing water. The GALL Report recommends further evaluation of plant-specific programs to manage these aging effects.*

Item Number 3.5.1-38 is not applicable. Hope Creek does not have Group 7 and 8 structures. **stainless steel tank liners exposed to standing water in the scope of license renewal. The stainless steel skimmer surge tank liners exposed to treated water are evaluated in Table 3.3.1, Item 3.3.1-24 and Subsection 3.3.2.2.10.2.**

**Table 3.5.1 Summary of Aging Management Evaluations for Structures and Component Supports**

Component	Aging Effect/ Mechanism	Aging Management Programs	Further Evaluation Recommended	Discussion
Groups 7, 8: Tank liners	Cracking due to stress corrosion cracking; loss of material due to pitting and crevice corrosion	A plant-specific aging management program is to be evaluated	Yes, plant specific	Not Applicable. <b><i>This item applies to stainless steel tank liners exposed to standing water.</i></b> Hope Creek does not have Group 7 and 8 structures <b><i>stainless steel tank liners exposed to standing water in the scope of license renewal.</i></b> <b><i>The stainless steel skimmer surge tank liners exposed to treated water are evaluated in Table 3.3.1, Item 3.3.1-24 and Subsection 3.3.2.2.10.2.</i></b>  See Subsection 3.5.2.2.2.5.

2. SRP Section 3.5.2.2.2.5 “Cracking due to Stress Corrosion Cracking and Loss of Material due to Pitting and Crevice Corrosion” is not applicable. As described above Hope Creek does not have Group 7 and 8 stainless steel tank liners exposed to standing water in scope of license renewal. The aging management review evaluated the skimmer surge tanks as tanks in a treated water environment and not as a Group 8 structure liner with a standing water environment.

The skimmer surge tanks are stainless steel liners, which provide a flow path from the fuel pool to the fuel pool cooling pumps. Cracking due to stress corrosion cracking and loss of material due to pitting and crevice corrosion aging effects were considered for the skimmer surge tanks. For this reason, LRA Table 3.5.2-8 (Reactor Building), on page 3.5.1-198, contains the component type, Steel Components: Skimmer Surge Tank liner, susceptible to loss of material, and was aligned to LRA Table 3.3.1 (Summary of Aging Management Evaluations for the Auxiliary Systems) item 3.3.1-24, on Page 3.3-67. In the Discussion column of Table 3.3.1, SRP Subsection 3.3.2.2.10.2 was determined to be applicable to the Hope Creek skimmer surge tanks for Loss of Material due to Pitting and Crevice Corrosion. Consistent with GALL Report, the recommended aging management programs for this SRP Section were used to manage the aging effects of loss of material, Water Chemistry (LRA Appendix B, Section B.2.1.2) and One-Time Inspection AMP (LRA Appendix B, Section B.2.1.22). Cracking due to stress corrosion cracking is not an applicable aging effect for the skimmer surge tanks since the fuel pool water temperature is less than 140°F and the Fuel Pool Cooling and Cleanup System water flows continuously through these tanks.

Therefore the aging effects of loss of material for the skimmer surge tank liners exposed to treated water will be managed by the Water Chemistry and One - Time Inspection aging management programs through the period of extended operation.