PSEG Nuclear LLC
P.O. Box 236, Hancocks Bridge, NJ 08038

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U.S. Nuclear Regulatory Commission
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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 14, 2010, Related to Section 3 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 (TAC NO. ME1832)", dated June 14, 2010

In the referenced letter, the NRC requested additional information related to Section 3 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 7/12/10

Sincerely,

Paul J. Davison

Paul J. Davison
Vice President, Operations Support
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 3.0.3.2.10-01
RAI 3.1.1-15-01
RAI 3.3.2.10-1

RAI 3.0.3.2.10-01

Background:

The applicant discussed the Fuel Oil Chemistry Program enhanced procedures for Hope Creek as part of the License Renewal Application. During the staff review of the enhanced sampling procedures for the main fuel oil storage tank, the diesel fire pump fuel oil storage tanks, and the diesel fuel oil storage tanks, it was noted that the procedures state that if a significant amount of water (greater than two ounces per gallon of fuel) is present, then a Notification per the Corrective Action Plan should be submitted.

Issue:

It is not clear how the person performing the testing will be able to complete the analysis with the current level of detail provided in the procedure. For example, with the main fuel oil storage tank, it was unclear how the tester would be able to discern two ounces of water in a 10 gallon sample. With the diesel fire pump fuel oil storage tank sample, it was unclear what level of water was rejectable, given that only a one liter sample was specified to be drawn.

Request:

Please clarify how there is reasonable assurance that the analyses requested to be performed in the enhanced procedures will be performed correctly.

PSEG Response:

The Hope Creek Fuel Oil Chemistry Aging Management Program (Hope Creek LRA Appendix B, Section B.2.1.20) includes existing procedures for sampling new fuel oil deliveries and stored fuel oil. These procedures require analysis of the sampled fuel oil for the presence of water and sediment by a qualified laboratory in accordance with ASTM Standard D2709.

The existing site procedures instruct personnel to visually estimate and record the total volume of water and sediment (i.e. negligible, cups, or gallons) collected during pre-sample flushing and in the fuel oil samples that are sent to the laboratory. This visual observation is intended as preliminary examination for significant amounts of water and sediment prior to sending the samples to the laboratory. The laboratory then performs analysis for water and sediment contamination in accordance with ASTM D2709. The laboratory results are then reviewed by site personnel. Water and sediment concentrations that exceed 0.05% by volume are entered into the corrective action system. The criterion of 0.05% by volume is consistent with NUREG-1801, Revision 1, XI.M30, "Fuel Oil Chemistry."

The proposed procedure changes which were reviewed by the staff during the AMP audit included additional guidance to personnel collecting the samples. These proposed procedure changes were not reviewed and approved by site personnel and, therefore, were not approved for use at Hope Creek. The proposed procedural changes were not intended to replace or supersede the existing requirements to send the samples to the laboratory nor was it intended to replace the existing criteria of less than 0.05% by volume as measured by ASTM Standard D2709. The proposed procedure changes (i.e. "2 ounces per gallon") will be removed from the proposed enhanced procedures because this guidance is not required to provide reasonable assurance that the analysis requested will be performed correctly.

RAI 3.1.1-15-01

Background:

The Generic Aging Lessons Learned (GALL) Report Item IV.C1-2 recommends that aging management should be performed according to Chapter XI.M12, "Thermal Aging Embrittlement of Cast Austenitic Stainless Steel (CASS)."

Issue:

In its review of components associated with AMR line item 3.1.1-15, the staff noted that cast austenitic stainless steel (CASS) is not listed as one of the materials. Additionally, for CASS flow elements, SRP-LR Table 3.1-1, item 57 recommends aging management for loss of fracture toughness due to thermal aging embrittlement. However, license renewal application (LRA) Table 3.4.2-4 includes two 3.1.1-15 line items under Table 1 items (flow elements, Class 1) with CASS as the material, and credits the LRA Boiler Water Reactor Water Chemistry and the One-Time Inspection Aging Management Programs (AMPs).

Request:

The staff requests that the applicant explain the following:

a) Why aging management review (AMR) line item 3.1.1-57 is not applicable when the GALL Report only exempts pump and valve bodies, and
b) Why the flow elements associated with AMR line item 3.1.1-15 do not credit GALL AMP XI.M12, "Thermal Aging Embrittlement of Cast Austenitic Stainless Steel (CASS)" to manage loss of fracture toughness/thermal aging embrittlement.

PSEG Response:

a) Hope Creek LRA Table 3.1.1 Summary of Aging Management Evaluations for the Reactor Vessel, Internals, and Reactor Coolant System, on Pages 3.1-36 and 3.1-37, provides the following discussion for why line item 3.1.1-57 is not applicable to Hope Creek.

   "The Class 1 CASS flow restrictor nozzles in the Main Steam System are not susceptible thermal embrittlement because the nozzles were cast by a centrifugal casting method using low molybdenum stainless material (SA351 CF8). In accordance with the guidance provided in the NUREG 1801, Volume 2, Section XI.M12, the centrifugally cast, low molybdenum CASS portion of the flow restrictors is not susceptible to thermal aging embrittlement."

b) Based on the above, loss of fracture toughness/thermal aging embrittlement is not an applicable aging effect/mechanism for the CASS nozzle sections of the Main Steam flow elements associated with AMR line item 3.1.1-15. In addition, GALL AMP XI.M12, Thermal Aging Embrittlement of Cast Austenitic Stainless Steel (CASS) states:

   "***Scope of Program:*** The program includes screening criteria to determine which CASS components are potentially susceptible to thermal aging embrittlement and require augmented inspection. The screening criteria are applicable to all primary pressure boundary and reactor vessel internal components constructed from SA-351 Grades

CF3,CF3A, CF8, CF8A, CF3M, CF3MA, CF8M, with service conditions above 250°C (482°F)."

The CASS nozzle sections of the Main Steam flow elements are not primary pressure boundary or reactor vessel internal components. Therefore, GALL AMP XI.M12, "Thermal Aging Embrittlement of Cast Austenitic Stainless Steel (CASS) program is not used for Hope Creek."

RAI 3.3.2.10-1

Background:

LRA Table 3.3.2-10, page 3.3-191, states that gray cast iron (retarding chamber) tanks exposed to raw water environment has an aging effect of loss of material due to general, pitting, crevice, galvanic, and microbiologically influenced corrosion, and fouling, and that the aging effects will be managed by the Fire Water System Program. The AMR line items reference Table 1 line item 3.3.1-68 and GALL Report item VII.G-24, for piping, piping components, and piping elements, and also cite generic note C, indicating that the component is different, but consistent with NUREG-1801 item for material, environment, and aging effect.

Issue:

The staff reviewed GALL AMP XI.M27, Fire Water System, and noted that the AMP recommends wall thickness evaluations of fire protection piping be performed using non-intrusive technique (e.g., volumetric testing) to identify loss of material due to corrosion. Based on a telephone conversation with the applicant on May 25, 2010, the applicant clarified that the retarding chamber is a vertical pipe installed in a horizontal piping system and acts like a tank. The staff infers that this vertical pipe is a low point in the system and will have stagnant water and will be susceptible to loss of material due to general, pitting and crevice corrosion. It is not clear from a review of LRA Section B.2.1.18, Fire Water System Program, whether volumetric inspection to detect loss of material due to corrosion will be performed on the internal surface (specifically the bottom) of the fire water and the retarding chamber tanks.

Request:

Clarify if the (retarding chamber) tanks are included in the sample of fire protection system components that will be volumetrically inspected for wall thickness evaluation to detect loss of material prior to loss of intended function. If not included, please justify how loss of material due to general, pitting, crevice, galvanic, and microbiologically influenced corrosion, and fouling will be detected from the bottom surface of these tanks.

PSEG Response:

Wet pipe sprinkler systems at Hope Creek with sprinkler water supply pipe greater than four inch nominal diameter are provided with an alarm check valve to detect sprinkler system flow. Sustained flow from operation of one or more of the fused sprinkler heads will initiate an alarm to alert plant personnel of sprinkler system actuation. When the alarm check valve main valve clapper is opened by system flow, an auxiliary valve clapper is also opened to allow pressurized water to enter an alarm line and flow to the retarding chamber tank. The retarding chamber tank is a self-draining tank that prevents spurious actuation of the alarm pressure switch during normal surges in system pressure. The retarding chamber tank volume is approximately two gallons. During sprinkler system actuation, flow through the alarm line exceeds the retarding chamber tank bottom drain capacity, and the tank fills with water. As the tank fills, the tank air space pressure increases and actuates the pressure switch connected to the top of the tank. Flow to the retarding chamber tank continues during sprinkler system operation, flowing out of the open tank drain. Flow to the tank is limited by the small diameter alarm line piping and fittings and does not impact the capability to provide design flow to the sprinkler heads.

Water does not normally collect in the retarding chamber tanks, due to the open drain located at the bottom of the tank. Retarding chamber tanks are not located at a low point in the system and do not contain stagnant water. The tanks are exposed to fire protection system water during system testing, but are otherwise normally drained as described above. Fire protection system water at Hope Creek is fresh water pumped from onsite wells. Fire protection system water is considered a raw water environment for license renewal because it is not subject to the water chemistry controls applicable to treated water.

The GALL AMP XI.M27, Fire Water System, recommends wall thickness evaluations of fire protection piping be performed using non-intrusive technique (e.g., volumetric testing) to identify loss of material due to corrosion. The GALL program further recommends that inspections be capable of evaluating both the wall thickness and the inner diameter of the piping, to preclude catastrophic failure and to ensure design flow capability. The GALL program states that "Continuous system pressure monitoring, system flow testing, and wall thickness evaluations of piping are effective means to ensure that corrosion and biofouling are not occurring and the system's intended function is maintained."

System pressure monitoring and flow testing are part of the existing Hope Creek Fire Protection aging management program. In order to meet the GALL recommended wall thickness evaluations of fire protection piping, the Hope Creek LRA, Appendix A, Section A.2.1.18, Fire Water System, includes Enhancement 1 to inspect selected portions of the water based fire protection system piping exposed to the fire water internal environment using non-intrusive volumetric examinations. This enhancement is also identified in Appendix A, Section A.5, License Renewal Commitment List number 18, and in Appendix B, Section B.2.1.18, Fire Water System.

The retarding chamber tanks are not included in the sample of fire protection system components that will be volumetrically inspected for wall thickness evaluation. The non-intrusive volumetric inspections will be performed on a selected sample of fire protection piping to evaluate wall thickness and ensure design flow capability. The retarding chamber tanks support the system alarm function and are not part of the sprinkler system water suppression flowpath, and therefore do not affect design flow capability.

The retarding chamber tanks are normally drained and not exposed to stagnant water. Potential corrosion inside the normally drained retarding chamber tanks, including the tank bottom surface, is expected to be less significant than potential corrosion in fire protection system piping filled with stagnant water. Fire protection wet pipe sprinkler system piping downstream of the flow alarm valve is normally filled with stagnant water, and is included in the sample of piping that will be volumetrically inspected. The results of piping wall thickness inspections in stagnant pipe lines are representative of potential corrosion conditions on internal surfaces of the retarding chamber tanks, including the tank bottom surface. Therefore, loss of material due to general, pitting, crevice, galvanic, and microbiologically influenced corrosion, and fouling of the bottom surface of the retarding chamber tanks will be detected prior to loss of system intended function.