

July 15, 2008

Mr. Britt T. McKinney  
Sr. Vice President and Chief Nuclear Officer  
PPL Susquehanna, LLC  
769 Salem Blvd., NUCSB3  
Berwick, PA 18603-0467

SUBJECT: REQUEST FOR ADDITIONAL INFORMATION FOR THE REVIEW OF THE  
SUSQUEHANNA STEAM ELECTRIC STATION, UNITS 1 AND 2, LICENSE  
RENEWAL APPLICATION

Dear Mr. McKinney:

By letter dated September 13, 2006, PPL Susquehanna, LLC submitted an application pursuant to Title 10 of the *Code of Federal Regulation* Part 54 (10 CFR Part 54), to renew the operating licenses for Susquehanna Steam Electric Station, Units 1 and 2, 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 Duane Filchner, 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 e-mail [evelyn.gettys@nrc.gov](mailto:evelyn.gettys@nrc.gov).

Sincerely,

**/RA/**

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

Docket Nos. 50-387 and 50-388

Enclosure:  
As stated

cc w/encl: See next page

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Evelyn Gettys, Project Manager  
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SUSQUEHANNA STEAM ELECTRIC STATION UNITS 1 AND 2  
LICENSE RENEWAL APPLICATION  
REQUEST FOR ADDITIONAL INFORMATION (RAI)

**RAI 3.1-01**

For multiple aging management review (AMR) result lines in Table 3.1.2-1 where the environment is “treated water (internal)” and the aging effect is either “loss of material” or “loss of material (cladding),” the aging management program (AMP) identified in the license renewal application (LRA) is the boiling water reactor (BWR) Water Chemistry Program, which provides an aging mitigation (preventive) function. For these AMR results the LRA does not identify an AMP to confirm effectiveness of the BWR Water Chemistry Program for these components. Please provide an AMP to confirm effectiveness of the BWR Water Chemistry Program for these components, or provide a technical justification as to why confirmation of effectiveness of the BWR Water Chemistry Program to mitigate loss of material during the period of extended operation is not needed for these components.

**RAI 3.1-02**

For the AMR result line on page 3.1-76 of the LRA where the component is “Main Steam flow elements / restrictors,” the material is “carbon steel,” and the aging effect is “loss of material,” please provide a technical justification as to why confirmation of effectiveness of the BWR Water Chemistry Program is not needed. Also, please justify use of Note D for this AMR result.

**RAI 3.1-03**

For multiple AMR result lines in LRA Table 3.1.2-3, the environment is “treated water (internal),” the aging effect is “loss of material,” and the AMPs are BWR Water Chemistry Program and Small Bore Class 1 Piping Inspection. The note assigned to these AMR result lines is either note A, or note C, and the AMP is consistent with the GALL Report. However, the AMPs recommended in the GALL Report for this material, environment and aging effect combination are XI.M2 Water Chemistry and XI.M32 One-Time Inspection. Since the AMP stated in the LRA is not the same as the AMP recommended in the GALL Report for these component, material, environment and aging effect combinations, please justify why notes A and C are appropriate for these AMR results lines.

**RAI 3.1-04**

On page 3.1-84 of the LRA, an AMR result line for stainless steel tubing in treated water identifies an aging effect of cracking and identifies the AMP as the BWR Water Chemistry Program. This line also refers to the GALL Report item IV.C1-1, which recommends that this component, material, environment and aging effect combination use AMP XI.M1 American Society of Mechanical Engineers (ASME) Section XI Inservice Inspection (ISI), AMP XI.M2 Water Chemistry, and AMP XI.M35 One-Time Inspection of ASME Code Class 1 Small-bore Piping. Please provide a technical justification as to why an inspection program is not needed to confirm effectiveness of the BWR Water Chemistry Program in preventing or mitigating the aging effect of cracking in these components.

ENCLOSURE

**RAI 3.1-05**

In the GALL Report item IV.C1-3 recommends AMP X1.M1 ASME Section XI Inservice Inspection for managing the aging effect of reduction of fracture toughness in cast austenitic stainless steel (CASS) valve bodies. On page 3.1-90 of the LRA, for valve bodies <4 inch, the AMP used to manage this aging effect is the Small Bore Class 1 Piping Inspection. Please provide technical justification for use of the Small Bore Class 1 Piping Inspection for managing this aging effect in Valve Bodies <4 inches; and include in your response what inspection techniques will be used and what part of the valve bodies will be inspected.

**RAI 3.1-06**

The LRA Table 3.1.2-3 contains multiple lines where the components are small bore piping components made of stainless steel, the environment is “treated water (internal), the aging effect is cracking, and the AMPs are BWR Water Chemistry Program and Small Bore Class 1 Piping Inspection. For these component, material, environment and aging effect combination, the GALL Report recommends AMP XI.M1 ASME Section XI Inservice Inspection Program, AMP XI.M2 Water Chemistry Program and AMP XI.M35 One-Time Inspection of ASME Code Class 1 Small-bore Piping. Since the AMPs identified in the LRA are not the same as the AMPs recommended in the GALL Report for this component, material, environment and aging effect combination, please provide technical justification that the AMPs listed in the LRA provide adequate management of the aging effect during the period of extended operation and justify why note A is appropriate for these AMR results lines.

**RAI 3.1-07**

Two AMR result lines in the LRA Table 3.1.2-3 for piping & fittings <4 inch and for valve bodies <4 inch show the material is carbon steel, the environment is “treated water (internal),” the aging effect is cracking and the AMP is the Small Bore Class 1 Piping Inspection. The component, material, environment and aging effect combination for these lines appears to be the same as in the GALL Report line IV.C1-1 (where the material is stainless steel or steel). Please explain why SSES used note H for these lines when note H means that the aging effect is not in the GALL Report for the specified component, material and environment combination. Also, please justify that the AMP specified by Susquehanna Steam Electric Station (SSES) for these components provides satisfactory aging management, comparable to the AMPs recommended in the GALL Report line IV.C1-1.

**RAI 3.1-08**

For multiple AMR results lines in the LRA Table 3.1.2-1, the recommended AMP is the BWR Water Chemistry Program, alone, and Note H is used indicating that for this component, material, environment combination, the aging effect is not included in the GALL Report. For these lines the material is low alloy steel with stainless steel cladding, the environment is “treated water (internal),” and the aging effect is “cracking – SSC (cladding).” Since the BWR Water Chemistry Program does not include an inspection activity to confirm effectiveness of the program to mitigate the aging effect, please provide technical justification for not including a confirmatory AMP, such as the Water Chemistry Effectiveness Inspection, for these components.

**RAI 3.2-01**

In the LRA Tables 3.2.2-2 and 3.2.2-4 there are AMR results for stainless steel tubing in a treated water environment and with an aging effect of cracking. The AMP specified in the LRA for these lines is the BWR Water Chemistry Program. The LRA does not provide an AMP to confirm effectiveness of the BWR Water Chemistry Program in preventing cracking in these components. Please provide a technical justification as to why confirmation of effectiveness of the BWR Water Chemistry Program is not needed for these components. Also, please justify the use of Note A.

**RAI 3.2-02**

In the LRA Tables 3.2.2-1, 3.2.2-2, 3.2.2-3 and 3.2.2-4, there are multiple AMR result lines that reference to the LRA Table 1 items 3.2.1-27, 3.2.1-28 or 3.2.1-29. For all of these lines, the aging effect is loss of material. For all of these lines the GALL Report recommends using AMP XI.M21 Closed-Cycle Cooling Water System for aging management of the applicable component, material, environment and aging effect combinations. The GALL Report AMP XI.M21 includes both preventive measures to mitigate the aging process and component inspections and functional testing to confirm the effectiveness of the preventive measures. The LRA states that aging management will be accomplished using the BWR Water Chemistry Program, which provides measures to prevent or mitigate aging effects, but no component inspections to detect aging effects. Please justify why an inspection is not performed to verify the effectiveness of the water chemistry program and confirm that loss of material is not occurring in these components.

**RAI 3.2-03**

For five AMR results lines in LRA Tables 3.2.2-1, 3.2.2-3, 3.3.2-25, and 3.4.2-3, where the material is copper alloy, the environment is treated water (internal) and the aging effect is cracking, the AMP specified in the LRA is the BWR Water Chemistry Program. Please provide a technical justification as to why an inspection program such as the Chemistry Program Effectiveness Inspection is not needed to confirm that the BWR Water Chemistry Program is effective in preventing the aging effect of cracking in the listed components. Also for the components in the Condensate Transfer and Storage System, please provide additional clarification as to why Note G, rather than Note H, is appropriate for this AMR result.

**RAI 3.3-01**

On page 3.5-83 of the LRA, there is an AMR result line for Spent Fuel Rack Neutron Absorbers where the material is Boral. For this component the environment is exposed to treated water, the aging effect is loss of material, and the AMP specified in the LRA is the BWR Water Chemistry Program. The GALL Report states that a plant specific AMP is to be evaluated for this combination of component, material, environment and aging effect. Section 3.3.3.2.6 of the Standard Review Plan for License Renewal (SRP-LR) requires that an adequate program will be in place to manage the reduction of neutron absorbing capability and loss of material due to general corrosion of the neutron-absorbing sheets in spent fuel storage racks. Section 3.3.2.2.6 of the LRA states that Boral does not degrade as a result of long-term exposure to radiation, and that based on plant-specific operating experience and testing results of Boral sample

coupons, reduction of neutron-absorbing capability and loss of material due to general corrosion are not aging effects requiring management for the SSES spent fuel rack neutron absorbers. Please provide a technical justification as to why an inspection program such as the Chemistry Program Effectiveness Inspection is not needed to confirm that age-related degradation of the component is not occurring. If the technical justification is based on the result of a sample coupon test, then please provide additional details of the testing. Include the range of water chemistry conditions used in the test and whether the test duration was adequate to ensure that the aging effects progression is very slowly or if testing requiring a long incubation period would have manifest results more indicative of the period of extended operation.

### **RAI 3.3-02**

Page 3.3-103 of the LRA includes an AMR result for accumulator (pistons) made of aluminum in a treated water environment with an aging effect of cracking. The AMP identified in the LRA is the BWR Water Chemistry Program, which provides an aging mitigation (preventive) function, and Note H is used indicating that for this component, material, environment combination, the aging effect is not included in the GALL Report. The AMR line item in the LRA refers to the GALL Report item VII.E3-7, which has the same material and environment, but has the aging effect of loss of material due to pitting and crevice corrosion. The LRA reference to GALL item VII.E.3-7 appears to be inconsistent with use of Note H, and the LRA does not identify an AMP to confirm effectiveness of the BWR Water Chemistry Program in mitigating this aging effect of cracking in this component. Please reconcile or justify the apparent inconsistency between reference to a specific GALL Report item and the use of Note H. Also, please provide technical justification for not including a confirmatory AMP, such as the Water Chemistry Effectiveness Inspection, for managing the aging effect of cracking in these components.

### **RAI 3.3-03**

Multiple AMR result lines in the LRA Section 3.3 refer to the GALL Report item VII.E3-16, where the AMP recommended in the GALL Report is XI.M25, BWR Reactor Water Cleanup System. In Table B-1, the LRA states that SSES does not credit a BWR Reactor Water Cleanup System program for aging management. In lieu of the BWR Reactor Water Cleanup System program, SSES proposes to use the BWR Water Chemistry Program for aging management of these components. The GALL Report's AMP BWR Reactor Water Cleanup System, is both a preventive and a monitoring program. However, the BWR Water Chemistry program is only a preventive program. Since SSES is crediting the water chemistry program, please justify why an inspection is not performed to verify the effectiveness of the water chemistry program and confirm that cracking is not occurring in these components.

### **RAI 3.3-04**

In the LRA Table 3.3.2-13 there are three AMR result lines where the aging effect is cracking, the AMP is designated as the Fuel Oil Chemistry Program, and Note B is used. Note B means that the AMR result is consistent with the GALL Report for component, material, environment, and aging effect, but the AMP takes some exceptions to the GALL Report. However, in the GALL Report the AMPs recommended for this component, material, environment and aging effect combination is XI.M26 Fire Protection Program and the Fuel Oil Chemistry Program. Please justify use of Note B for these AMR result lines. Also, please explain how effectiveness

of the Fuel Oil Chemistry Program is confirmed for these components and clarify whether piping and/or tubing associated with this material and environment combination is included in the AMR results in the LRA.

**RAI 3.3-05**

In the LRA Table 3.3.2-7 there are seven AMR results lines where the aging effect is cracking, the AMP is designated as the Fuel Oil Chemistry Program, and note H is used. Note H indicates that this aging effect is not in the GALL Report for this component, material and environment combination. Since the Fuel Oil Chemistry Program does not include a component inspection activity to confirm that the aging effect is not occurring in potentially affected components, please explain how the effectiveness of the Fuel Oil Chemistry Program is confirmed for these components, or provide justification that the Fuel Oil Chemistry Program's effectiveness is not needed.

**RAI 3.3.2.2.9.1-1**

In the SRP-LR, Section 3.3.2.2.9.1 identifies the aging effects of loss of material due to general, pitting, crevice, and microbiologically induced corrosion and fouling that could occur for steel piping, piping components, piping elements, and tanks exposed to fuel oil. However, the LRA Section 3.3.2.2.9.1 states that "fouling is not identified as an aging effect for fuel oil."

Please provide a technical basis or explanation for the statement in the LRA that, "fouling is not identified as an aging effect for fuel oil."

**RAI 3.4.2.2.7.1-1**

In the LRA Section 3.4.2.2.7.1 states, "There are no aging effects identified for aluminum piping components subject to aging management review in the Steam and Power Conversion System." The meaning and intention of this statement in the LRA is unclear to the staff.

- a) Are there aluminum piping components that are in scope for license renewal and that are in a treated water environment in the Steam and Power Conversion System?
- b) If so, then provide your technical basis for claiming that there are no aging effects applicable for these components, and revise the LRA to include this ARM result in the appropriate AMR Results table.

Letter to B. McKinney from E. Gettys, dated July 15, 2008

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