

November 19, 1999

Mr. Douglas J. Walters  
Nuclear Energy Institute  
1776 I Street, NW., Suite 400  
Washington, DC 20006-3708

**SUBJECT: LICENSE RENEWAL ISSUE NO. 98-0105, "HEAT EXCHANGERS HEAT TRANSFER FUNCTION"**

Dear Mr. Walters:

Enclosed is the staff's evaluation and proposed resolution of the subject issue. The staff found that a clarification should be added to the Standard Review Plan for License Renewal and NEI 95-10. Accordingly, if there are any industry comments on the evaluation basis or the proposed resolution, we request that you document those comments within 30 days following your receipt of this letter to ensure a timely resolution of this issue. If you have any questions regarding this matter, please contact Hai-Boh Wang at 301-415-2958.

Sincerely,

Original Signed By

Christopher I. Grimes, Chief  
License Renewal and Standardization Branch  
Division of Regulatory Improvement Programs  
Office of Nuclear Reactor Regulation

Project 690  
Enclosure: As stated  
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(License Renewal Steering Committee)**

**Project No. 690**

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LICENSE RENEWAL ISSUE NO. 98-0105  
HEAT EXCHANGERS HEAT TRANSFER FUNCTION

1. BACKGROUND

Section 54.21(a)(1)(i) of Title 10 of the Code of Federal Regulations specifies that heat exchangers are components that are subject to an aging management review and that perform an intended function without moving parts or without a change in configuration or properties.

Section 3.0.III.C of the draft Standard Review Plan for the Review of License Renewal Applications for Nuclear Power Plants (SRP-LR) states, in part: "Performance monitoring programs test the ability of a structure or component to perform its intended function(s), for example, heat balances on heat exchangers for the heat transfer intended function of the tubes."

Experience from the first two renewal applications and industry comments on the generic renewal guidance has demonstrated that, while it is generally understood that the pressure boundary function of the heat exchanger is within the scope of license renewal, some believe that heat exchangers are active with respect to the heat transfer function, and that the heat transfer intended function need not be subject to a separate aging management review.

2. EVALUATION

In 10 CFR 54.21, the following requirement is stated: "Each application must contain the following information: (a) An integrated plant assessment (IPA). The IPA must—

(1) For those systems, structures, and components within the scope of this part, as delineated in §54.4, identify and list those structures and components subject to an aging management review. Structures and components subject to an aging management review shall encompass those structures and components -

(i) That perform an intended function, as described in §54.4, without moving parts or without a change in configuration or properties. These structures and components include, but are not limited to... steam generators... heat exchangers, ventilation ducts... the containment, the containment liner...."

As stated in 10 CFR 54.21(a)(1)(i), heat exchangers perform their intended function(s) without moving parts or without a change in configuration or properties. The staff believes that the Commission intended to include the pressure boundary function and the heat transfer function. The pressure boundary is maintained by the shell and other parts of the heat exchangers. Heat transfer is conducted through the tube wall, which may be made from different materials. Although the cooling fluid is moving and may

involve local boiling (a change of state), heat exchangers do not have any moving parts. Therefore, the staff does not believe that the heat transfer function could be reasonably described as "active."

Furthermore, the Statement of Consideration (SOC) (60 FR 22469) states the following:

"The Commission believes that regardless of the specific aging mechanism, only aging degradation that leads to degraded performance or condition (i.e., detrimental effects) during the period of extended operation is of principal concern for license renewal. Because the detrimental effects of aging are manifested in degraded performance or condition, an appropriate license renewal review would ensure that licensee programs adequately monitor performance or condition in a manner that allows for the timely identification and correction of degraded conditions. The Commission concludes that a shift in focus to managing the detrimental effects of aging for license renewal review is appropriate and will provide reasonable assurance that systems, structures, and components are capable of performing their intended function during the period of extended operation."

This objective can be best achieved by considering both the pressure boundary and heat transfer functions for heat exchangers, because heat transfer is a primary safety function of these components. There may be a unique aging effect associated with different materials in the heat exchanger parts that are associated with the heat transfer function and not the pressure boundary function. The staff would expect that the programs that effectively manage aging effects of the pressure boundary function can, in conjunction with the procedures for monitoring heat exchanger performance, effectively manage aging effects applicable to the heat transfer function.

Heat transfer is also a parameter considered in the design of most of the other safety-related structures and components, but not as a primary safety function like that associated with steam generators and heat exchangers. For example, while the heat capacity of the containment and interior structures is included in the modeling of the pressure and temperature transient for loss-of-coolant accidents, these secondary heat-transfer functions of safety-related structures and components need not be a specific focus of the aging management review for license renewal.

### 3. RESOLUTION

On the basis of the preceding evaluation, the staff has determined that its proposed position as stated in SRP-LR Section 3.0.III.C is consistent with the rule. However, the clarification of the distinction between the pressure boundary and heat transfer functions, as well as the distinction between the primary and secondary heat transfer functions should be added to the SRP-LR as well as NEI 95-10.

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