March 8, 2004

Mr. Jeff Forbes
Vice President, Operations ANO
Entergy Operations, Inc.
1448 S. R. 333
Russellville, AR 72801

SUBJECT: REQUEST FOR ADDITIONAL INFORMATION FOR THE REVIEW OF THE ARKANSAS NUCLEAR ONE, UNIT 2, LICENSE RENEWAL APPLICATION (TAC NO. MB8402)

Dear Mr. Forbes:

The U.S. Nuclear Regulatory Commission (NRC) is reviewing a license renewal application (LRA) submitted by Entergy Operators Inc. (Entergy or the applicant) dated October 14, 2003 for the renewal of the operating licenses for Arkansas Nuclear One, Unit 2, pursuant to Title 10 *Code of Federal Regulations* Part 54 (10 CFR Part 54). The NRC staff has identified, in the enclosure, areas where additional information is needed to complete the review. Specifically, the enclosed requests for additional information (RAIs) are from Section 3.2, Engineered Safety Features, Section 3.4, Steam and Power Conversion Systems, and Appendix B, Section B.1.2 Bolting and Torquing Activities. These RAIs have been discussed with your staff.

Your responses to these RAI's are requested within 30 days from the date of this letter. If you have any questions on the revised review schedule, please contact me at (301) 415-1124 or e-mail gxs@nrc.gov.

Sincerely,

/***RA***/

Gregory F. Suber, Project Manager
License Renewal Section A
License Renewal and Environmental Impacts Program
Division of Regulatory Improvement Programs
Office of Nuclear Reactor Regulation

Docket No.: 50-368

Enclosure: As stated

cc w/encl: See next page

March 8, 2004

Mr. Jeff Forbes
Vice President, Operations ANO
Entergy Operations, Inc.
1448 S. R. 333
Russellville, AR 72801

SUBJECT: REVISION OF SCHEDULE FOR THE CONDUCT OF REVIEW OF THE ARKANSAS NUCLEAR ONE, UNIT 2, LICENSE RENEWAL APPLICATION (TAC NO. MB8402)

Dear Mr. Forbes:

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Sincerely,
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REQUEST FOR ADDITIONAL INFORMATION OF
SAFETY FEATURES AND STEAM & POWER CONVERSION SYSTEMS AND
BOLTING AND TORQUING ACTIVITIES PROGRAM FOR
ARKANSAS NUCLEAR ONE - UNIT 2
LICENSE RENEWAL APPLICATION (TAC NO. MB8402)

Engineered Safety Features Systems

RAI 3.2-1

In LRA Table 3.2.1, Item 3.2.1-18, under Discussion, the applicant stated that this AMR item was not considered to match the ANO-2 AMR results. The applicant also stated that for closure bolting, the aging effect requiring management is loss of mechanical closure integrity, which includes a broader range of aging mechanisms than those included in this line item (i.e., loss of material due to general corrosion; crack initiation and growth due to cyclic loading and/or SCC). In view of the above, the applicant is requested to:

(1) Explain the extent to which AMR Item 3.2.1-18 is not considered to match the ANO-2 AMR results.

(2) Clarify whether the aging effect of "loss of mechanical closure integrity" will include loss of material and cracking, and discuss what other aging effects/mechanisms are included in the "broader range."

(3) Discuss how each of the identified aging effects will be managed and why the approach for managing the aging effects is adequate.

(4) Demonstrate that with the combination of bolting and torquing activities, boric acid corrosion prevention, and system walkdown programs, as stated in AMR Item 3.2.1-18, the aging effects associated with closure bolting will be adequately managed, or managed in a manner equivalent to that described in NUREG-1801, XI.M18, "Bolting Integrity." The response is to include, but not be limited to, a discussion addressing why the GALL program stipulates the inspection requirements of ASME Code, Section XI, whereas the bolting and torquing activities program does not.

RAI 3.2-2

In LRA Tables 3.2.2-1 and 3.2.2-2, respectively, for ECCS and containment spray system, loss of mechanical closure integrity is identified as one of the aging effects (besides loss of material) requiring management for carbon steel bolting in outdoor air (external) environments. Boric acid corrosion prevention and system walkdown are credited for managing the aging effect of loss of mechanical closure integrity. In view of AMR Item 3.2.1-18, the applicant is requested to explain why the bolting and torquing activities program is not also identified as a required AMP. The applicant is also requested to provide a detailed description of the potential aging effects included under "loss of mechanical closure integrity," and discuss how they will be managed by the stated AMPs.

RAI 3.2-3

In LRA Table 3.2.2-3, for containment cooling system, loss of material is identified as the aging effect requiring management for carbon steel bolting in air (external) and condensation (external) environments, and stainless steel bolting in condensation (external) environments. The applicant is requested to explain why loss of mechanical closure integrity is not identified as an aging effect requiring management for the bolting, and how it would be managed if identified.

RAI 3.2-4

In LRA Table 3.2.2-4, for containment penetrations system in air (external) environments, loss of mechanical closure integrity is identified as one of the aging effects (besides loss of material) requiring management for carbon steel bolting and as the aging effect for stainless steel bolting. Bolting and torquing activities program was credited for managing the aging effect of loss of mechanical closure integrity for both the stainless steel and carbon steel bolting. In view of AMR Item 3.2.1-18, the applicant is requested to explain why the system walkdown program is not credited as an AMP. Similar to RAI 3.2-3, the applicant is also requested to provide a detailed description of the aging effects included under "loss of mechanical closure integrity," and discuss how they will be managed by the stated AMP.

RAI 3.2-5

In LRA Table 3.2.2-1, for ECCS system, a water chemistry control program is used to manage cracking and loss of material for the stainless steel components, such as heat exchanger (tubes), orifices, piping, pump casing, thermowells, tubing, and valves in a treated borated water >270°F (internal) environment. Water chemistry control program is also used to manage loss of material for the stainless steel components, such as heat exchanger (tubes), nozzles, orifices, piping, pump casing, tanks, tubing, and valves in a treated borated water (internal) environment. The applicant is requested to explain, for the above cases, why a supplemental inspection program is not needed for verifying the effectiveness of the water chemistry control program, or, otherwise, include a verification program in the components' AMR.

RAI 3.2-6

In LRA Table 3.2.2-2, for the containment spray system, a water chemistry control program is used to manage cracking and loss of material for the stainless steel components, such as orifices, piping, thermowells, tubing, and valves in a treated borated water >270°F (internal) environment. Water chemistry control program is also used to manage loss of material for the stainless steel components, such as filter housings, nozzles, orifices, piping, tanks, thermowells, tubing, and valves, as well as the cast stainless steel pump casing, in a treated borated water (internal) environment. The applicant is requested to explain, for the above cases, why a supplemental inspection program is not needed for verifying the effectiveness of the water chemistry control program, or, otherwise, include a verification program in the components' AMR.

RAI 3.2-7

In LRA Table 3.2.2-4, for containment penetration system, a water chemistry control program is used to manage cracking and loss of material for a stainless steel valve in a treated borated water >270°F(internal) environment. The applicant is requested to explain why a supplemental inspection program is not needed for verifying the effectiveness of the water chemistry control program, or, otherwise, include a verification program in the component's AMR.

RAI 3.2-8

In LRA Table 3.2.2-5, for hydrogen control system, loss of material is identified as an aging effect requiring management for the carbon steel bolting in air (external) environments. The applicant is requested to explain why loss of mechanical closure integrity and its associated AMPs are not specified for the bolting.

RAI 3.2-9

In LRA Tables 3.2.2-1, 3.2.2-2, 3.2.2-3, and 3.2.2-5 for ECCS, containment spray, containment cooling, and hydrogen control systems, respectively, no aging effects are identified for the stainless steel bolting in air (external) environments, whereas in Table 3.2.2-4, for containment penetrations system, stainless steel bolting in the same environments is subject to loss of mechanical closure integrity. Explain the differences in the above AMR results.

RAI 3.2-10

In LRA Table 3.2.2-5, no aging effects are identified for the stainless steel heat exchanger (tubes) exposed to condensation (internal) environments. Industry experience has indicated that stainless steel is susceptible to the aging effect of loss of material when exposed to condensation with periodic wetting and drying. The applicant is requested to explain why an aging effect is not identified for the component.

Steam and Power Conversion Systems

RAI 3.4-1

In LRA Table 3.4.1, Item 3.4.1-8, under Discussion, the applicant stated that for closure bolting, the aging effect requiring management is loss of mechanical closure integrity, which includes a broader range of aging mechanisms than those included in this line item (i.e., loss of material due to general corrosion; crack initiation and growth due to cyclic loading and/or SCC). The applicant also stated that different programs than the NUREG-1801 bolting integrity program are used. The system walkdown program is used to supplement bolting and torquing activities to maintain bolting integrity. In view of the above, the applicant is requested to:

(1) Explain the extent to which AMR item 3.4.1-8 deviates from the ANO-2 AMR results.

(2) Clarify whether the aging effect of loss of mechanical closure will include loss of material and cracking, and discuss what other aging effects/mechanisms are included in the "broader range."

(3) Discuss how each of the identified aging effects are to be managed and why the approach for managing the aging effects is adequate.

(4) Demonstrate that with the combination of bolting and torquing activities and system walkdown program, as stated in AMR Item 3.4.1-8, the aging effects associated with closure bolting will be adequately managed, or managed in a manner equivalent to that described in NUREG-1801, XI.M18, "Bolting Integrity." The response is to include, but not be limited to, a discussion addressing why the GALL program stipulates the inspection requirements of ASME Code, Section XI, whereas the bolting and torquing activities program does not.

RAI 3.4-2

In LRA Tables 3.4.2-1 through 3.4.2-3, loss of mechanical closure integrity is identified as the aging effect requiring management, for both the stainless steel and carbon steel bolting in an air (external) environment. Bolting and torquing activities is credited for managing the aging effect. The applicant is requested to provide a detailed description of the aging effects included under "loss of mechanical closure integrity," and discuss how they will be managed by the stated AMP.

RAI 3.4-3

In LRA Table 3.4.2-1, for main steam system, water chemistry control program is used to manage cracking and loss of material for the stainless steel components, such as expansion joints, piping, thermowells, tubing, and valves in a steam > 270°F (internal) environment, the stainless steel piping in a treated water > 270°F (internal) environment, as well as the stainless tubing in a treated water > 220°F (internal) environment. The applicant is requested to explain, for the above cases, why a supplemental inspection program is not needed for verifying the effectiveness of the water chemistry control program, or, otherwise, include a verification program in the components' AMR.

RAI 3.4-4

In LRA Table 3.4.2-2, for main feedwater system, a water chemistry control program is used to manage cracking and loss of material for the stainless steel tubing and valves in a treated water > 270°F (internal) environment. The applicant is requested to explain why a supplemental inspection program is not needed for verifying the effectiveness of the water chemistry control program, or, otherwise, include a verification program in the components' AMR.

RAI 3.4-5

In LRA Table 3.4.2-3, for emergency feedwater system, a water chemistry control program is used to manage cracking and loss of material for the stainless steel orifice in a steam > 270°F (internal) environment. The applicant is requested to explain why a supplemental inspection program is not needed for verifying the effectiveness of the water chemistry control program, or, otherwise, include a verification program in the components' AMR.

RAI 3.4-6

In LRA Table 3.4.2-3, for emergency feedwater system, a water chemistry control program is used to manage loss of material for the following component/environment combinations: the stainless steel heater housing in a treated water (external) environment; the stainless steel orifice, piping, tank, thermowell, tubing, and valve in a treated water (internal) environment; the carbon steel piping, steam trap, tubing, and valve in a treated water (internal) environment; as well as the carbon steel piping and valve in a treated water > 220°F (internal) environment. It is noted that GALL (VIII.G.1-c, VIII.G.3-a, and VIII.G.4-b) specifically recommends that the water chemistry control program is to be augmented by verifying the effectiveness of water chemistry control. The applicant is requested to justify, for the above cases, that such a supplemental program is not needed, or, otherwise, include a verification program as recommended by GALL.

RAI 3.4-7

In LRA Table 3.4.2-3, for emergency feedwater system, no aging effect was identified for the glass component in lube oil (internal) environments. The applicant is requested to provide the basis of such conclusion.

Bolting and Torquing Activities

RAI B.1.2-1

In LRA Appendix B, Section B.1.2, “Bolting and Torquing Activities,” under Scope of Program, the applicant stated that the program covers bolting in high temperature systems and in applications subject to significant vibration as determined during aging management reviews. No specific guideline was provided as to whether the program covers all bolting within the scope of license renewal including safety-related bolting, bolting for NSSS component supports, bolting for other pressure retaining components, and structural bolting. In addition, no specific guideline was provided addressing whether the program covers both greater than and smaller than 2-in. diameter bolting. The applicant is requested to provide the information as stated in the above. The applicant is also requested to assure that the recommendations and guidelines for the plant-specific bolting program conforms to the industry’s technical basis.

RAI B.1.2-2

In LRA Appendix B, Section B.1.2, “Bolting and Torquing Activities,” under Parameters Monitored/Inspected, the applicant stated that torque values are monitored when the bolted closure is assembled, and maintenance personnel visually inspect components used in the bolted closures to assess their general condition during maintenance. The applicant is requested to discuss the specifics of the conditions of the closure bolting to be inspected, and to explain why torque values are the only parameters specified to be monitored. The applicant is also requested to provide details of the methods of its visual inspection, and explain why inspection techniques other than the visual inspection, are not included in the program.

RAI B.1.2-3

In LRA Appendix B, Section B.1.2, “Bolting and Torquing Activities,” under Detection of Aging Effects, the applicant stated that preventive actions under the program prevent loss of mechanical closure integrity. No discussion was provided as to what aging effects/ mechanisms requiring management are included under the aging effect of loss of mechanical closure integrity. The applicant is, therefore, requested to provide a detailed description of the aging effects considered to attribute to the loss of mechanical closure integrity, and how the AMP is expected to manage them. The applicant is requested to ensure that, as delineated in GALL XI.M18 “Bolting Integrity,” the inspection requirements of the ASME Code, Section XI is met.

RAI B.1.2-4

In LRA Appendix B, Section B.1.2, “Bolting and Torquing Activities,” under Monitoring and Trending, the applicant stated that torque values are monitored during the bolt torquing process. Although the applicant invokes the ANO-2 Corrective Action Program to prevent repeat failures, details of the inspection schedule were not provided. The applicant is, therefore, requested to include in the program, the frequency of the inspection and the basis for such frequency. The applicant is requested to ensure that, as delineated in GALL XI.M18 “Bolting Integrity,” the inspection requirements of the ASME Code, Section XI is met.

RAI B.1.2-5

In LRA Appendix B, Section B.1.2, “Bolting and Torquing Activities,” under Acceptance Criteria, the applicant stated that typical criteria would verify that mating surfaces are smooth and free of major defects. The staff considers the applicant’s criteria inadequate because potential aging effects which might render the mating surfaces unacceptable are not specified. To ensure that mating surfaces perform their intended function as a pressure retaining boundary, the applicant is requested to specify that the surfaces be thoroughly inspected, for potential aging effects, such as corrosion, cracking, and/or leaking. All relevant indications and signs of degradation would need to be identified and documented for corrective actions. As a result, adequate inspection methodologies should also be specified in the program for the aging effects which the components are susceptible to. The applicant is requested to ensure that, as delineated in GALL XI.M18 “Bolting Integrity,” the inspection requirements of the ASME Code, Section XI is met.

RAI B.1.2-6

In LRA Appendix B, Section B.1.2, “Bolting and Torquing Activities,” under Operating Experience and Conclusion, the applicant stated that “the bolting and torquing activities program provides reasonable assurance that the aging effects associated with bolted closures will be managed...” In light of the questions raised in RAI B.1.2-3, the applicant is requested to clarify what “aging effects” are being referred to here. The applicant is also requested to elaborate on the types of repetitive occurrences of deficient bolting and torquing activities identified by the ANO staff, and how they were dispositioned.

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