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U. S. Nuclear Regulatory Commission
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Subject: Arkansas Nuclear One - Unit 2
Docket No. 50-368
License No. NPF-6
Additional Information in Support of Proposed License Change for Cycle 14
Risk-Informed Operation

Gentlemen:

On March 9, 2000 (2CAN030003), Entergy Operations submitted a proposed license change to allow risk-informed operation for the remainder of the 14th operational cycle for Arkansas Nuclear One, Unit 2 (ANO-2). Supplemental information in support of the proposed change was submitted on April 11, 2000 (2CAN040005). Based on several interactions with the Staff concerning the proposed change, the following supplemental information is provided as attachments to this letter:

1. Emergency Feedwater(EFW)/Auxiliary Feedwater (AFW) Discussion
   1a. ANO Calculation 89-E-0048-07, "ANO-2 Emergency Feedwater System Analysis Work Package," Rev. 1
   1b. ANO-2 EFW Basic Event Listing
   1c. Recovery Events AFWFEEDREC and AFWFEEDRES
   1d. ANO-2 AFW System Fault Tree
   1e. ANO-2 AFW Basic Event Listing
2. 2P99 Steam Generator "B" Eggcrate Flaw Data
3. Aptech Report AES 00033958-1-1, "Structural Integrity Evaluation of Axial Outside Diameter Stress Corrosion Cracking at Eggcrate Supports for Arkansas Nuclear One Unit 2 Under Severe Accident Conditions"
4. EPRI Report TR-107623, "Steam Generator Tube Integrity Risk Assessment, Volume 1: General Methodology"
5. Affidavit for EPRI Report TR-107623
6. Authorization to Reproduce Copyrighted Publication
7. Eggcrate Axial Flaw In-Situ Test Data

AP01

Attachment 5 to the April 11, 2000, submittal was incorrectly identified as Aptech Report AES 00033958 when it was actually Aptech Report AES 99113855-1-1, "Structural Integrity Evaluation of Axial Outside Diameter Stress Corrosion Cracking at Supports for Arkansas Nuclear One, Unit 2, During Cycle 14 Post Mid-Cycle Operation." Aptech Report AES 00033958-1-1 is provided as Attachment 3 in this submittal.

Report TR-107623, included as Attachment 4, is considered proprietary by EPRI. An affidavit from EPRI is included in Attachment 5. The affidavit sets forth the basis on which the information may be withheld from public disclosure by the NRC and addresses the considerations listed in 10CFR2.790(b)(4). Accordingly, Entergy Operations requests that the report contained in Attachment 4 be withheld from public disclosure. An authorization for reproduction of this copyrighted report is included as Attachment 6.

Should you have questions concerning the information provided, please contact me.

Very truly yours,

Jimmy D. Vandergrift
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JDV/jjd
attachments

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Attachment 1

Emergency Feedwater/Auxiliary Feedwater Discussion

A copy of the Arkansas Nuclear One, Unit 2 (ANO-2), Emergency Feedwater (EFW) System Analysis Work Package (Calculation 89-E-0048-07, Rev. 1) is provided as Attachment 1a. This document provides the EFW system fault tree model, basic events which occur in the EFW fault tree, and bases for the EFW fault tree model. This model was combined with other system fault trees logic to create the integrated ANO-2 Probabilistic Safety Assessment (PSA) Model, Rev. 1 (main body of report previously submitted as Attachment 6 to 2CAN040005, April 11, 2000). Results of this integrated fault tree model were used as an input to the ANO-2 Cycle-14 Steam Generator (SG) Tube Rupture Risk Assessment, documented in Calculation 99-E-0019-01, Rev. 1 (previously submitted with 2CAN030003, March 9, 2000). A listing of the EFW basic events and their associated probabilities is provided as Attachment 1b.

A fault tree for the Auxiliary Feedwater (AFW) system was not employed in the ANO-2 Cycle-14 Steam Generator Tube Rupture Risk Assessment. Instead, since the use of the AFW system involved operator action, use of the AFW system was accounted for via operator recovery actions AFWFEEDREC and AFWFEEDRES. These events were applied manually after the ANO-2 Rev-1 cut sets were generated. AFW support system dependencies were accounted for in the manual recovery process. Attachment 1c provides descriptions and bases for these recovery events. Each of these recovery events is composed of a human failure event and an estimate for the AFW hardware failure associated with the operator action.

Since the SG tube rupture risk assessment is based on the ANO-2 PSA Model, Rev-1 cut sets and since a fault tree for AFW was not part of the ANO-2 PSA Model, Rev-1, the AFW system hardware failure rate was estimated in the AFW recovery events.

It should be noted that a fault tree for the ANO-2 AFW system was developed after the completion of the ANO-2 PSA Model, Rev-1. This model was not employed in the SG tube rupture risk assessment, because, as stated above, the subject assessment was based on existing ANO-2 PSA Model, Rev-1 cut sets. Although it was not used, Attachment 1d provides a listing of the AFW fault tree. There are three tops to the AFW fault tree model: QA110-F (AFW to EFW Train A), QA210-F (AFW to EFW Train B), and QA310-F (AFW to main feedwater). Attachment 1e provides a listing of the basic events that occur in this fault tree. In order to produce the fault tree listing, transfer gates to other systems (e.g., AC power, DC power) were converted to basic events. These events are noted as such. Since these events are transfer gates and not basic events, a basic event probability was not provided in Attachment 1e.

Neither the EFW or AFW fault tree models nor the AFW recovery actions describe the effect of the Loss of DC power initiators (i.e., T10 and T11) on the EFW and AFW systems. The effect of the Loss of DC Bus 2D01 (i.e., T10) is the loss of 2D01. In the PSA model, the loss of 2D01 is conservatively assumed to result in a plant trip and the subsequent failure to transfer to off site power and the failure of Emergency Diesel Generator 2DG1. These failures will subsequently result in the loss of power to EFW Train B and the loss of power to AFW. The initiator has no effect on EFW Train A. The

effect of the Loss of DC Bus 2D02 (i.e., T11) is the loss of 2D02. In the PSA model, the loss of 2D02 is conservatively assumed to result in a plant trip and the subsequent failure to transfer to off site power and the failure of Emergency Diesel Generator 2DG2. These failures will subsequently result in the loss of power to EFW Train A. The initiator has no effect on EFW Train B nor on AFW.