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2CAN110901

November 10, 2009

U.S. Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, DC 20555

SUBJECT: Response to Request for Additional Information
Technical Specification 6.6.5, Core Operating Limits Report
Arkansas Nuclear One, Unit 2
Docket No. 50-368
License No. NPF-6

REFERENCES:
1. Entergy letter to the NRC, dated May 15, 2009, "License Amendment Request to Revise Technical Specification 6.6.5, Core Operating Limits Report" (2CAN050902)
2. Email from Kaly Kalyanam (NRC) to Robert W. Clark (Entergy), dated September 23, 2009, "ME1329 – ANO-2 LAR on COLR"

Dear Sir or Madam:

In Reference 1, Entergy Operations, Inc. (Entergy) requested an amendment to Arkansas Nuclear One, Unit 2 (ANO-2) Technical Specification (TS) 6.6.5, Core Operating Limits.

Subsequent to the submittal, the NRC determined that additional information was required to complete their review of the request. Attached are the requests for additional information (RAIs) and the responses to each. As a result of responding to these RAIs, the proposed changes provided in Reference 1 will be revised such that the COLR parameter-to-methodology cross-reference will be maintained. The other proposed changes provided in Reference 1 are unchanged as justified in Attachment 1. Attachment 2 contains the revised markups of the proposed changes to the ANO-2 TS.

As noted in Reference 1, the cycle-specific COLR will be updated and issued once this request has been approved. Any new or revised COLR must be submitted to the NRC upon issuance in accordance with TS 6.6.5; therefore the updating of the COLR is not treated as a new commitment. Although this request is neither exigent nor emergency, your prompt review is requested.

If you have any questions or require additional information, please contact David Bice at 479-858-5338.

I declare under penalty of perjury that the foregoing is true and correct. Executed on November 10, 2009.

Sincerely,

Original signed by Kevin T. Walsh

KTW/rwc

Attachments: 1. Response to Requests for Additional Information
2. Proposed Technical Specification Changes (mark-up)

cc: Mr. Elmo E. Collins
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Attachment 1 to

2CAN110901

Response to Requests for Additional Information

RESPONSE TO REQUESTS FOR ADDITIONAL INFORMATION

By letter dated May 15, 2009 (Reference 1), Entergy Operations, Inc. (Entergy) made application to amend the Technical Specifications (TS) of the Arkansas Nuclear One, Unit 2 (ANO-2). The proposed changes include revising ANO-2 TS 6.6.5, Core Operating Limits Report (COLR). The NRC Staff has reviewed the amendment request and determined that we require additional information to complete our review. A request for additional information (RAIs) appears below.

This request was discussed with Robert Clark of your staff on September 21 and 23, 2009, and it was agreed that a response would be provided within 45 days of receipt of this email.

REQUEST FOR ADDITIONAL INFORMATION

Based on the guidance specified in Generic Letter 88-16 (GL 88-16), each approved methodology listed in TS 6.6.5.b should support a calculation for a cycle-specific core operating limit listed in TS 6.6.5.a. In other words, the methodologies listed in TS 6.6.5.a, should identify its supporting role for the cycle-specific parameters listed in TS 6.6.5.a, in order to be qualified as a part of TS 6.6.5.b.

Please provide:

a) a description to explain why no date of approval and use of the approved methodologies are proposed for TS 6.6.5.b:

<u>Entergy Response</u>

The proposed changes reflect the guidance in Technical Specification Task Force (TSTF) Traveler No. 383-A, "Revised Topical Report References in ITS 5.6.5, COLR." The NRC-approved TSTF provides the guidance that the analytical methods listed in the TSs to be identified with the Topical Report number and title only.

The use of the TSTF was approved by the NRC for ANO-2 via Reference 5. The NRC Safety Evaluation (SE) states in Reference 5 that this method of "referencing Topical Reports (TRs) allows the licensee to use current TRs to support limits in the COLR without having to submit an amendment to the TSs each time the TR is revised. The licensee also notes that future changes to the values of these limits by the licensee may only be developed using NRC approved methodologies, must remain consistent with all applicable plant safety analysis limits addressed in the safety analysis report, and are further controlled by the 10 CFR 50.59 process. The staff concludes that the licensee's amendment conforms to the guidance in NRC GL 88-16 and TSTF-363." Therefore, consistent with the NRC previous approval in Reference 5 and TSTF-383-A no approval date or revision of the referenced reports are provided in the proposed TS.

b) identification of cycle-specific parameter listed in TS 6.6.5.a corresponding to an approved methodology listed in TS 6.6.5.b with respect to a real application to the current reload analysis; and

Entergy Response

In Reference 1, Entergy proposed the removal of all the cross-references between the methodologies and the COLR parameter. This was proposed in an attempt to gain a measure of consistency with other licensees. This cross-referencing is not required by regulation or regulatory guidance.

In discussions with the Staff, this RAI was clarified to mean that only the methods that directly determine the value of the COLR parameter value is to be listed.

ANO-2 TS 6.6.5.c requires that "the core operating limits shall be determined such that all applicable limits (e.g., fuel thermal mechanical limits, core thermal hydraulic limits, Emergency Core Cooling System (ECCS) limits, nuclear limits such as SDM, transient analysis limits, and accident analysis limits) of the safety analysis is met."

It should be noted that the current ANO-2 TS 6.6.5 listing of NRC-approved methodologies and COLR are consistent with the information requirements of NRC regulations and guidance documents with respect to implementation and material content.

The current ANO-2 Safety Analysis Report (SAR), TSs and COLR were reviewed in conjunction with the listing of NRC-approved methodologies in the various TSs and COLRs that were described in Reference 1. The purpose of this review was to identify whether the current ANO-2 TS 6.6.5 listing of NRC-approved methodologies and COLR differ if a noteworthy manner from similar documents at other facilities.

This review included the COLR parameter associations for ANO-2. The results of this particular review helped to identify which specific methodologies were cited and their association with which particular COLR parameter. Two principal observations were made.

1. There is an older methodology that is not used in any current analyses and should be deleted. This is the CESEC methodology and it was proposed in Reference 1 to be deleted from the TS listing.

2. Methodologies used for SAR Chapters 6 and 15 safety analyses are cited for numerous parameters for which they are not the methodology explicitly used to establish the value for the parameter. Rather, the safety analysis results only confirm the acceptability of the parameter value which was actually established explicitly using another methodology (typically, physics). This is an iterative process wherein a parameter value is established based on core management / design considerations and the safety analysis results confirm its acceptability. If not acceptable, the core design is adjusted and a new parameter value established. This iterative process continues until the safety analysis results

confirm the acceptability of the parameter in question when compared to NRC requirements.

An example was provided in Reference 1 and other examples have been shared with the Staff. The majority of the methods currently listed in the ANO-2 TS 6.6.5 fall into the second category listed above. It is difficult to describe this connection in the TS.

One TR (WCAP-16500) listed in TS 6.6.5 is not tied to any one parameter but is not proposed for deletion. This is the TR for the Next Generation Fuel design. In the SE report for this TR, the NRC added the condition that this TR be added to the COLR listing (Reference 6).

Based on the above, Entergy believes it is prudent to maintain the current cross-referencing between methodologies and COLR parameters. Entergy further believes that removal of these references provides no safety benefit and could lead to difficult explanations in future amendment requests in justifying why these references are not applicable to the COLR. As stated previously, these references play an important role in verifying limits established in the COLR remain acceptable.

c) justification that all the proposed methodologies are qualified to be listed in TS 6.6.5.b

Entergy's Response

The RAIs suggested that the methodologies listed in TS 6.6.5.a should identify the explicit supporting role for the cycle-specific parameters listed in TS 6.6.5.a, in order to be qualified as a part of TS 6.6.5.b.

As noted in the previous response, the CESEC methodology is no longer used in the ANO-2 analyses and, therefore, is proposed for deletion from the TS. All other currently listed methodologies (with noted exception) are used in either determining the value for the parameter limit listed in TS 6.6.5.a or confirming the value meets the safety analysis requirements. Therefore, Entergy believes these methodologies do qualify for retention in TS 6.6.5.b. With regard to WCAP-16500, its retention is solely based on meeting a condition of the use of the TR as previously specified by the NRC (Reference 6).

References

1. Entergy letter to the NRC, dated May 15, 2009, "License Amendment Request to Revise Technical Specification 6.6.5, Core Operating Limits Report" (2CAN050902)

2. Entergy letter to the NRC, dated March 10, 2009, "License Amendment Request Technical Specification Change to Delete COLR References" (2CAN030902)

3. Entergy letter to the NRC, dated April 21, 2009, "Withdrawal of License Amendment Requires to Revise Technical Specification 6.6.5, Core Operating Limits Report" (2CAN040903)

4. Entergy letter to the NRC, dated May 12, 2004, “License Amendment Request to Support Cycle 18 Core Reload” (2CAN050405)

5. NRC letter to Entergy, dated March 23, 2005, “Arkansas Nuclear One, Unit 2 (ANO-2) Issuance of Amendment RE: License Amendment Request to Support Cycle 18 Core Reload” (TAC NO. MC3246)

6. NRC letter to Westinghouse, dated July 30, 2007, “Final Safety Evaluation for Westinghouse Electric Company (Westinghouse) Topical Report (TR) WCAP-16500-P, Revision 0, ‘CE (Combustion Engineering) 16 x 16 Next Generation Fuel (NGF) Core Reference Report’” (TAC No. MD0560)

Attachment 2 to

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Proposed Technical Specification Changes (mark-up)

6.6.5 CORE OPERATING LIMITS REPORT (COLR)

a. Core operating limits shall be established prior to each reload cycle, or prior to any remaining part of a reload cycle, and shall be documented in the COLR for the following:

3.1.1.1 Shutdown Margin – T_{avg} > 200°F
3.1.1.2 Shutdown Margin - $T_{avg} \leq$ 200°F
3.1.1.4 Moderator Temperature Coefficient
3.1.3.1 CEA Position
3.1.3.6 Regulating and Group P CEA Insertion Limits
3.2.1 Linear Heat Rate
3.2.3 Azimuthal Power – Tq
3.2.4 DNBR Margin
3.2.7 Axial Shape Index

b. The analytical methods used to determine the core operating limits shall be those previously reviewed and approved by the NRC, specifically those described in the following documents:

1) ”Qualification of the PHOENIX-P/ANC Nuclear Design System for Pressurized Water Reactor Cores” (WCAP-11596-P-A), “ANC: A Westinghouse Advanced Nodal Computer Code” (WCAP-10965-P-A), and “ANC: A Westinghouse Advanced Nodal Computer Code: Enhancements to ANC Rod Power Recovery” (WCAP-10965-P-A Addendum 1) (Methodology for Specifications 3.1.1.1 and 3.1.1.2 for Shutdown Margins, 3.1.1.4 for MTC, 3.1.3.6 for Regulating and Group P CEA Insertion Limits, and 3.2.4.b for DNBR Margin)..

2) "CE Method for Control Element Assembly Ejection Analysis," CENPD-0190-A (Methodology for Specification 3.1.3.6 for Regulating and Group P CEA Insertion Limits and 3.2.3 for Azimuthal Power Tilt).

3) "Modified Statistical Combination of Uncertainties, CEN-356(V)-P-A, Revision 01-P-A (Methodology for Specification 3.2.4.c and 3.2.4.d for DNBR Margin and 3.2.7 for ASI).

4) "Calculative Methods for the CE Large Break LOCA Evaluation Model," CENPD-132-P (Methodology for Specification 3.1.1.4 for MTC, 3.2.1 for Linear Heat Rate, 3.2.3 for Azimuthal Power Tilt, and 3.2.7 for ASI).

5) "Calculative Methods for the CE Small Break LOCA Evaluation Model," CENPD-137-P (Methodology for Specification 3.1.1.4 for MTC, 3.2.1 for Linear Heat Rate, 3.2.3 for Azimuthal Power Tilt, and 3.2.7 for ASI).

6.6.5 CORE OPERATING LIMITS REPORT (COLR) (Continued)

6) "Technical Manual for the CENTS Code," WCAP-15996-P-A, Rev. 1 (CENPD 282-P-A (Methodology for Specifications 3.1.1.1 and 3.1.1.2 for Shutdown Margin, 3.1.1.4 for MTC, 3.1.3.1 for CEA Position, 3.1.3.6 for Regulating and Group P Insertion Limits, and 3.2.4.b for DNBR Margin.

7) "Implementation of ZIRLO Material Cladding in CE Nuclear Power Fuel Assembly Designs," CENPD-404-P-A (modifies CENPD-132-P and CENPD-137-P as methodology for Specification 3.1.1.4 for MTC, 3.2.1 for Linear Heat Rate, 3.2.3 for Azimuthal Power Tilt, and 3.2.7 for ASI).

8) "Qualification of the Two-Dimensional Transport Code PARAGON," WCAP-16045-P-A (may be used as a replacement for the PHOENIX-P lattice code as the methodology for Specifications 3.1.1.1 and 3.1.1.2 for Shutdown Margins, 3.1.1.4 for MTC, 3.1.3.6 for Regulating and Group P CEA Insertion Limits, and 3.2.4.b for DNBR Margin).

9) "Implementation of Zirconium Diboride Burnable Absorber Coatings in CE Nuclear Power Fuel Assembly Designs," WCAP-16072-P-A (Methodology for Specification 3.1.1.4 for MTC, 3.2.1 for Linear Heat Rate, 3.2.3 for Azimuthal Tilt, and 3.2.7 for ASI).

10) "CE 16 x 16 Next Generation Fuel Core Reference Report," WCAP-16500-P-A (Methodology for Specification 3.1.1.4 for MTC, 3.2.1 for Linear Heat Rate, 3.2.3 for Azimuthal Power Tilt, 3.2.4.b, 3.2.4.c and 3.2.4.d for DNBR Margin, and 3.2.7 for ASI).

11) "Optimized ZIRLO™," WCAP-12610-P-A and CENPD-404-P-A Addendum 1-A (Methodology for Specification 3.1.1.4 for MTC, 3.2.1 for Linear Heat Rate, 3.2.3 for Azimuthal Power Tilt, and 3.2.7 for ASI).

12) "Westinghouse Correlations WSSV and WSSV-T for Predicting Critical Heat Flux in Rod Bundles with Side-Supported Mixing Vanes," WCAP-16523-P-A (Methodology for Specification 3.2.4.b, 3.2.4.c and 3.2.4.d for DNBR Margin).

13) "ABB Critical Heat Flux Correlations for PWR Fuel," CENPD-387-P-A (Methodology for Specification 3.2.4.b, 3.2.4.c and 3.2.4.d for DNBR Margin and 3.2.7 for ASI).

14) "Calculative Methods for the CE Nuclear Power Large Break LOCA Evaluation Model – Improvement to 1999 Large Break LOCA EM Steam Cooling Model for Less Than 1 in/sec Core Reflood," CENPD-132, Supplement 4-P-A, Addendum 1-P-A (Methodology for Specification 3.1.1.4 for MTC, 3.2.1 for Linear Heat Rate, 3.2.3 for Azimuthal Power Tilt, and 3.2.7 for ASI).

c. The core operating limits shall be determined such that all applicable limits (e.g. fuel thermal mechanical limits, core thermal hydraulic limits, Emergency Core Cooling System (ECCS) limits, nuclear limits such as SDM, transient analysis limits, and accident analysis limits) of the safety analysis are met.

d. The COLR, including any midcycle revisions or supplements, shall be provided upon issuance for each reload cycle to the NRC.