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2CAN050902

May 15, 2009

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

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

REFERENCE: 1. Entergy Letter to NRC dated March 11, 2008, "Response to Request for Additional Information License Amendment Request to Revise Technical Specification 6.6.5, Core Operating Limits Report" (2CAN030801)

Dear Sir or Madam:

In Reference 1, Arkansas Nuclear One, Unit 2 (ANO-2) made a one-time commitment to review other similar plant's Technical Specifications (TS) methodology references that reflect NRC approved methods used in establishing the Core Operating Limits Report (COLR) parameter limits. Based on that evaluation, Entergy will propose a change to TS 6.6.5, to minimize the number of NRC approved references consistent with the guidance provided in Generic Letter 88-16, "Removal of Cycle-Specific Parameter Limits from Technical Specifications."

Pursuant to 10 CFR 50.90, Entergy hereby requests an amendment to ANO-2 TS 6.6.5, Core Operating Limits. This request fulfills the commitment made in Reference 1.

The proposed change has been evaluated in accordance with 10 CFR 50.91(a)(1) using criteria in 10 CFR 50.92(c) and it has been determined that this change involves no significant hazards consideration. The bases for these determinations are included in the attached submittal.

The proposed change does not include any new commitments. A similar change is being requested for Waterford Steam Electric Station, Unit 3 (Waterford 3) under a separate letter.

Entergy requests approval of the proposed amendment by June 1, 2010. Once approved, the amendment shall be implemented within 90 days. 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 May 15, 2009.

Sincerely,

Original signed by K. T. Walsh

KTW/rwc

Attachments:

1. Analysis of Proposed Technical Specification Change
2. Proposed Technical Specification Changes (mark-up)

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Attachment 1

2CAN050902

Analysis of Proposed Technical Specification Change

1.0 DESCRIPTION

This letter is a request to amend Operating License NPF-6 for Arkansas Nuclear One, Unit 2 (ANO-2).

The proposed change will revise ANO-2 Technical Specification (TS) 6.6.5, Core Operating Limits Report (COLR) by deleting the parenthetical COLR parameter-to-methodology cross-references, deleting reference to NRC approved methodologies that are no longer used, deleting a method from the listing of NRC-approved methodologies due to it being a supplement to a base methodology already listed in TS 6.6.5, and updating the referenced Combustion Engineering (CE) method title to the Westinghouse title (no change in actual method).

2.0 PROPOSED CHANGE

The proposed changes are administrative in nature and will modify TS 6.6.5 by:

1. Deletion of the parenthetical COLR parameter-to-methodology cross-references,
2. Deletion of the reference to the CESEC methodology (TS 6.6.5.b Method 6),
3. Deletion of the reference to a supplement to a Topical Report that is already listed in the TS (CENPD-132, Supplement 4-P-A, Addendum 1-P-A, TS 6.6.5.b Method 15),
4. Correction of the reference to the CENTS methodology (change to the current Westinghouse topical report title and number, TS 6.6.5.b Method 7).

Due to the above revisions to TS 6.6.5, some information is moved from TS page 6-21 to page 6-20. Relocation of such information from one page to another when no change to the information is being made is not noted with revision bar in the page margin in order to avoid confusion with the technical changes illustrated on each page.

3.0 BACKGROUND

In Reference 1, Entergy Operations, Inc. (Entergy) proposed to revise the ANO-2 TS 6.6.5 to add new NRC approved analytical methods to support the implementation of Westinghouse's Next Generation Fuel (NGF). During the submittal review process, a question was raised by the NRC. This Request for Additional Information (RAI) was informally transmitted to ANO-2 on February 7, 2008, and was framed as:

Under TAC MD6620, the proposed TS 6.6.5 COLR, addition of new methods to COLR, in the July 31, 2007 submittal, there are five new methodologies to be added to the TS COLR to support the coming cycle-specific operating parameters. However, many methods are proposed to support the same parameter. We would like the licensee to clarify that: (1) the proposed changes are applicable to the coming cycle; (2) how to apply the methods proposed to support same parameter such as 3 methods for MTC, 3 methods for Azimuthal Power Tilt, 4 methods for ASI, 3 methods for Linear Heat Rate, and 3 methods for DNBR.

In Reference 2, ANO-2 made a one-time commitment to review the COLR and its associated TS. Specifically, the commitment states:

Entergy commits to evaluate other similar plant's Technical Specification (TS) methodology references that reflect NRC approved methods used in establishing the COLR parameter limits. Based on that evaluation, Entergy will propose a change to TS 6.6.5, to minimize the number of references consistent with the guidance provided in Generic Letter 88-16, "Removal of Cycle-Specific Parameter Limits from Technical Specifications."

The review of the COLR information for possible updating included two categories of relevant documentation. One category focused on relevant plant documentation, specifically the listing of NRC-approved methodologies in the TS and the COLR itself. In this category a review of both the ANO-2 and Waterford 3 (W3) documentation was supplemented with two other Combustion Engineering (CE) designed Nuclear Steam Supply Systems (NSSS) plants that utilize 16 x 16 fuel as well as a digital protection system. The plants selected were San Onofre Nuclear Generating Station (SONGS) and the Palo Verde Nuclear Generating Station (PVNGS). During the course of the review, the listing of NRC-approved methodologies of several Westinghouse NSSS plant designs were reviewed as well to broaden the base of the industry approach to COLR implementation. Furthermore, a CE NSSS plant design using 14 x 14 fuel and an analog protection system was included. The review provided a means to compare ANO-2 to others in the industry for consistency and also address an element of the commitment made to the NRC.

The other category of information reviewed was the NRC regulatory requirements and guidance.

4.0 TECHNICAL ANALYSIS

With respect to implementation and material content, the 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. They are similar in content and presentation to other CE NSSS design plants using 16 x 16 fuel and which have digital protection systems.

During the review described In Section 3.0 above, two significant observations in the current ANO-2 TS 6.6.5 listing of NRC approved methodologies and the COLR were noted. First, the document retains references to methodologies that are no longer employed and second, the detailed methodology reference record in the COLR is incomplete for some methodologies. An additional observation was associated with the ties between each methodology listed to a COLR parameter. The listing of these cross-references in the TS does not appear to have been adopted in a uniform manner by other licensees. This cross-referencing is not required by regulation or regulatory guidance.

The proposed changes to TS 6.6.5 are intended to resolve the aforementioned findings.

A summary of the review and the details of the results of that review are provided below.

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 described above. 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 in 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 parameters. Two principal observations were made.

1. There is an older methodology referenced that is no longer used and should be considered for deletion (i.e., CESEC)
2. Methodologies used for UFSAR 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.

Deletion of the parenthetical COLR parameter-to-methodology cross-references

An example of Item 2 above is the Moderator Temperature Coefficient (MTC) parameter. Currently there are eight (8) separate methodologies listed for this parameter. These methodologies are as follows:

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)
2. "Qualification of the Two-Dimensional Transport Code PARAGON," (WCAP-16045-P-A)
3. "Technical Manual for the CENTS Code," (CENPD 282-P-A)
4. "Calculative Methods for the C-E Large Break LOCA Evaluation Model for the Analysis of C-E and W Designed NSSS" (CENPD-132-P, Supplement 3-P-A)
5. "Calculative Methods for the CE Nuclear Power Large Break LOCA Evaluation Model" (CENPD-132-P, Supplement 4-P-A)

6. "Calculative Methods for the CE Nuclear Power Large Break LOCA Evaluation Model – Improvements to 1999 Large Break LOCA EM Steam Cooling Model for Less Than 1 in/sec Core Reflood" (CENPD-132-P, Supplement 4-P-A, Addendum 1-P-A)
7. "Calculative Methods for the ABB CE Small Break LOCA Evaluation Model" (CENPD-137-P, Supplement 2-P-A)
8. "CE 16 x 16 Next Generation Fuel Core Reference Report" (WCAP-16500-P-A)

However, only the nuclear engineering (i.e., physics) methodologies (1 and 2 above) are actually used to explicitly establish the MTC. The safety analysis methodologies listed (3 through 7) simply confirm that acceptable consequences are achieved for the specified MTC. These methodologies have nothing to do with explicitly establishing the MTC. Likewise, methodology 8 is simply an overview document that describes the Westinghouse 16 x 16 NGF design and the NRC-approved methodologies used to evaluate that design. WCAP-16500-P-A is not itself a methodology per se. Rather, it is a roadmap to the methodologies applicable to that fuel design. Again, the specified topical report has nothing to do with explicitly establishing the MTC. WCAP-16500-P-A is included because NRC SE Limitation Number 9 requires its inclusion in the COLR. (Reference 3)

A review of the non-CE COLRs confirmed what had been observed when reviewing the SONGS and PVNGS COLR information. There is a mix of how the COLR presentation format is handled. For example, neither Beaver Valley nor Callaway link the COLR parameters and methodologies while both Seabrook and Turkey Point do link the COLR parameters and methodologies. There is not an existing standard format for the COLR.

To reduce the amount of potential confusion, ANO-2 will delete the link between the COLR parameter and the methodologies. The removal of these cross-references has no impact on the methods used to develop core design limits contained in the COLR and simply acts to delete unnecessary and potentially misleading information. Therefore, this change is acceptable.

Deletion of the reference to the CESEC methodology (TS 6.6.5.b Method 6)

As noted in NRC Generic Letter (GL) 88-16 (see Section 5.0 for detailed discussion) the next section the COLR is to include the values of cycle-specific parameter limits that have been established using an NRC-approved methodology and consistent with all applicable limits of the safety analysis. Based on the above discussion, the CESEC methodology will be deleted from the ANO-2 TS 6.6.5.b Reference 6 listing since it is not used to develop any of the ANO-2 safety analysis limits. This change is administrative in nature and has no impact on the methods used to develop core design limits contained in the COLR. Therefore, this change is acceptable.

Deletion of the reference to a supplement to a Topical Report that is already listed in the TS

As discussed in Section 5.1 below, the Administrative Control section of NUREG-1432, "Standard Technical Specifications Combustion Engineering Plants," states that licensees should:

Identify the Topical Report(s) by number and title or identify the staff Safety Evaluation Report for a plant specific methodology by NRC letter and date. The COLR will contain the complete identification for each of the TS referenced topical reports used to prepare the COLR (i.e., report number, title, revision, date, and any supplements).

TS 6.6.5.b Method 15 is Topical Report number CENPD-132, Supplement 4-P-A, Addendum 1-P-A. Method 4 in the same list is Topical Report number CENPD-132-P; therefore based on the guidance provided in NUREG-1432, Method 15 can be deleted from the list of methods in the TS. This change is administrative in nature and has no impact on the methods used to develop core design limits contained in the COLR because the listings are redundant to one another. Therefore, this change is acceptable.

Correction of CENTS reference to the equivalent Westinghouse title (TS 6.6.5.b Method 7).

When the CENTS methodology was revised, Westinghouse changed the numbering of the topical report from a CE numbering scheme to a Westinghouse numbering scheme. Therefore, TS 6.6.5.b Method 7 is being revised to refer to the equivalent Westinghouse title for this methodology. This change is administrative in nature and has no impact on the methods used to develop core design limits contained in the COLR. In light of this information, this change is acceptable.

Summary

The proposed changes will minimize and clarify the current listing of NRC-approved methodologies that are currently being used in the ANO-2 core designs and the determination of the actual operating limits for those cores. The proposed changes are being made to streamline and “clean up” the TS listing of NRC-approved methodologies used to develop the ANO-2 COLR.

Due to the above revisions to TS 6.6.5, some information is moved from one TS page 6-21 to page 6-20. Relocation of such information from one page to another when no change to the information is being made is not noted with revision bar in the page margin in order to avoid confusion with the technical changes illustrated on each page. The transfer of this information from one page to another is administrative in nature and is, therefore, acceptable.

5.0 REGULATORY ANALYSIS

5.1 Applicable Regulatory requirements/Criteria

There are three regulatory documents that relate to plant TSs and the COLR. These include:

1. 10 CFR 50.36, “Technical Specifications”
2. Generic Letter (GL) 88-16, “Removal of Cycle-Specific Parameter Limits from Technical Specifications”
3. NUREG-1432, Revision 3, “Standard Technical Specifications Combustion Engineering Plants”

The requirements / guidance provided by these documents are discussed in the following sections.

10 CFR 50.36, Technical Specifications

10 CFR 50.36 establishes the requirements for each licensee to create proposed TSs as part of their application for plant operation to be submitted for NRC review and approval. The TSs are derived from the analyses and evaluation included in the plant's safety analysis report (SAR) and amendments thereto.

10 CFR 50.36 does not explicitly address the use of the COLR. The regulation only speaks to the requirement to include the types of information identified in that section of the code. How the information is managed is left to other documents. In the case of the COLR, its use and management were introduced via GL 88-16.

GL 88-16, Removal of Cycle-Specific Parameter Limits from Technical Specifications

GL 88-16 is the vehicle through which the NRC promulgated its acceptance of a process to move cycle-specific parameter limits out of the TS Limiting Condition of Operation (LCO) section and relocate them in an administrative report so they could be processed, as necessary, pursuant to 10 CFR 50.59, "Changes, Tests and Experiments". Prior to the issuance of the GL, the method of controlling cycle-specific parameters, to assure conformance with 10 CFR 50.36, was to identify the specific value(s) determined to be within specified acceptance criteria (usually the limits of the safety analyses) using an approved calculation methodology and submitting these cycle-specific parameter values via a License Amendment Request (LAR) for NRC review and approval. This process had to be followed for each reload and possibly during a cycle if parameters changed. It was concluded that this formal submittal and review process did not represent an efficient use of licensee or NRC resources. GL 88-16 presented an alternative for the licensee to develop a COLR which would document the cycle-specific parameter values resulting from licensee calculations using NRC-approved methodologies. By strictly adhering to NRC-approved methodologies the need for licensee preparation of LARs and subsequent NRC review and approval was eliminated without increased risk to the public health and safety.

The GL does not identify any cycle-specific parameters. This is left to the individual licensee. However, the NRC guidance provided in the NUREG reports for the various vendors' standard TSs does offer a representative list of cycle-specific parameters. This is discussed below.

NUREG-1432, Rev. 3, "Standard Technical Specifications Combustion Engineering Plants"

NUREG-1432, Revision 3.1 documents the current standard TSs for CE designed NSSS plants. Although NUREG-1432 does not identify any TS COLR topical report methodology references, since these are plant specific, it does provide the outline for all of the elements discussed by the NRC in GL 88-16 and needed for COLR implementation. The NUREG does, however, suggest cycle-specific parameters for control via the COLR.

In the TS Administrative Controls section, NUREG-1432 places the TS COLR listing of NRC-approved methodologies in TS Section 5.6.5, and notes that licensees should:

Identify the Topical Report(s) by number and title or identify the staff Safety Evaluation Report for a plant specific methodology by NRC letter and date. The COLR will contain the complete identification for each of the TS referenced topical reports used to prepare the COLR (i.e., report number, title, revision, date, and any supplements).

This guidance indicates that the TS COLR listing of NRC-approved methodologies need only identify top level methodology topical reports by number and title. That is, issue dates and revision levels need not be provided. It then goes on to indicate that the COLR itself should contain the “complete” identification for each of the TS referenced topical reports implying that the issue dates and revision levels should be specified.

Summary

Entergy first implemented the use of the COLR for ANO-2 in 1994 (Reference 4). At that time, the ties between the COLR parameters and the TS listed methodology were added. This was performed due to the NRC approval of another facility TS amendment associated with the TS COLR listing based on the informal request of the NRC reviewer at the time. The ties (cross-references) between the COLR parameters and the NRC-approved methodologies have been maintained to this date (Reference 5).

The definition of a COLR in the existing ANO-2 TS is essentially the same as that provided in NUREG-1432. A comparison of the COLR parameters identified in NUREG-1432 along with the parameters identified in the latest revisions of the COLRs for ANO-2, W3, SONGS and PVNGS demonstrates that except for a few plant-specific parameters, there is a reasonable correlation between all the plants and the associated TS NUREG with respect to information presented in the COLR TS. Entergy has concluded that the ANO-2 implementation of the COLR TS with respect to the changes proposed in this submittal is consistent with others in the industry as well as with the NRC guidance in NUREG-1432. No change is necessary with regard to the COLR parameters selected.

Based on the above, Entergy has determined that the proposed changes do not require any exemptions or relief from regulatory requirements, other than the TS, and does not affect conformance with any General Design Criteria (GDC) differently than described in the SAR.

5.2 No Significant Hazards Consideration

The proposed change will modify the Arkansas Nuclear One, Unit 2 (ANO-2) Technical Specification (TS) related to the analytical methods that are used to confirm the safety of core operating limits by:

1. Deletion of the parenthetical COLR parameter-to-methodology cross-references,
2. Deletion of the reference to the CESEC methodology (TS 6.6.5.b Method 6),
3. Deletion of the reference to a supplement to a Topical Report that is already listed in the TS (CENPD-132, Supplement 4-P-A, Addendum 1-P-A, TS 6.6.5.b Method 15),
4. Correction of the reference to the CENTS methodology (change to the current Westinghouse topical report title and number, TS 6.6.5.b Method 7).

Entergy has evaluated whether or not a significant hazards consideration is involved with the proposed amendment by focusing on the three standards set forth in 10 CFR 50.92, "Issuance of amendment," as discussed below:

1. Does the proposed change involve a significant increase in the probability or consequences of an accident previously evaluated?

Response: No.

The proposed change to the list of NRC-approved methodologies listed in TS 6.6.5 are administrative in nature and have no impact on any plant configuration or system performance relied upon to mitigate the consequences of an accident. Changes to the calculated core operating limits may only be made using NRC-approved methodologies, must be consistent with all applicable safety analysis limits, and are controlled by the 10 CFR 50.59 process.

The proposed change will minimize and clarify the listing of the NRC-approved methodologies that are currently being used in the ANO-2 core designs and the determination of the operating limits for those cores. Assumptions used for accident initiators and/or safety analysis acceptance criteria are not altered by the proposed changes.

Therefore, the proposed change does not involve a significant increase in the probability or consequences of an accident previously evaluated.

2. Does the proposed change create the possibility of a new or different kind of accident from any accident previously evaluated?

Response: No.

The proposed change to the list of topical reports used to determine the operating limits has no impact on any plant configurations or on system performance that is relied upon to mitigate the consequences of an accident. These changes are administrative in nature and do not result in a change to the physical plant or to the modes of operation defined in the facility license.

Therefore, the proposed change does not create the possibility of a new or different kind of accident from any previously evaluated.

3. Does the proposed change involve a significant reduction in a margin of safety?

Response: No.

The proposed change does not amend the cycle specific parameter limits located in the COLR from the values presently required by the TS. The individual specifications continue to require operation of the plant within the bounds of the limits specified in COLR. The proposed change to the list of analytical methods referenced in the COLR is administrative in nature.

Therefore, the proposed change does not involve a significant reduction in a margin of safety.

Based on the above, Entergy concludes that the proposed amendment presents no significant hazards consideration under the standards set forth in 10 CFR 50.92(c), and, accordingly, a finding of “no significant hazards consideration” is justified.

6.0 ENVIRONMENTAL CONSIDERATIONS

The proposed amendment does not involve (i) a significant hazards consideration, (ii) a significant change in the types or significant increase in the amounts of any effluent that may be released offsite, or (iii) a significant increase in individual or cumulative occupational radiation exposure. Accordingly, the proposed amendment meets the eligibility criterion for categorical exclusion set forth in 10 CFR 51.22(c)(9). Therefore, pursuant to 10 CFR 51.22(b), no environmental impact statement or environmental assessment need be prepared in connection with the proposed amendment.

7.0 REFERENCES

1. Entergy Letter to NRC dated July 31, 2007, “License Amendment Request to Revise Technical Specification 6.6.5, Core Operating Limits Report” (2CAN070701)
2. Entergy Letter to NRC dated March 11, 2008, “Response to Request for Additional Information License Amendment Request to Revise Technical Specification 6.6.5, Core Operating Limits Report” (2CAN030801)
3. 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)
4. Entergy Letter to NRC dated July 22, 1993, “Proposed Technical Specification Change Request Per Generic Letter 88-16, ‘Removal of Cycle-Specific Parameter Limits from Technical Specifications’” (2CAN079301)
5. Entergy Letter to NRC dated May 22, 2008, “Revision 1 to the ANO-2 Cycle 20 COLR” (2CAN050802)

Attachment 2

2CAN050902

Proposed Technical Specification Changes (mark-up)

ADMINISTRATIVE CONTROLS

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 – $T_{avg} > 200^{\circ}\text{F}$
 - 3.1.1.2 Shutdown Margin - $T_{avg} \leq 200^{\circ}\text{F}$
 - 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 – T_q
 - 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) ~~"CESEC Digital Simulation of a Combustion Engineering Nuclear Steam Supply System" (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 CEA and Group P Insertion Limits, and 3.2.4.b for DNBR Margin).~~

ADMINISTRATIVE CONTROLS

6.6.5 CORE OPERATING LIMITS REPORT (COLR) (Continued)

- ~~76)~~ “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.~~
- ~~87)~~ “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).~~
- ~~89)~~ “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).~~
- ~~409)~~ “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).~~
- ~~104)~~ “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).~~
- ~~121)~~ “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).~~
- ~~123)~~ “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).~~
- ~~134)~~ “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).~~
- ~~15)~~ “~~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.