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Your ref: Docket No. 52-006
Our ref: DCP/NRC2228

August 15, 2008

Subject: AP1000 Proposed DCD Changes to Resolve the Piping DAC

Westinghouse is submitting proposed changes to the AP1000 Design Control Document to remove the Piping Design Acceptance Criteria (DAC) and to revise the COL information item related to the review of design specifications and design reports. The changes included in the enclosure are expected to be included in Revision 17 of the AP1000 Design Control Document. The information included in the response is generic and is expected to apply to all COL applications referencing the AP1000 Design Certification and the AP1000 Design Certification Amendment Application.

The Piping DAC is included as a table in the introduction to the AP1000 Design Control Document. This table was removed from the AP1000 Design Control Document in Revision 16 which was submitted in support of the Design Certification amendment. In response to concerns raised during the NRC acceptance review of the amendment application the Piping DAC was reincorporated by returning the information on the Piping DAC included in Revision 15 of the AP1000 Design Control Document. This information was included in APP-GW-GLR-134, Revision 2 (TR-134).

Since the acceptance review Westinghouse has completed additional piping analyses and had discussions with the NRC to define the information and analyses required to resolve the Piping DAC. Westinghouse and the NRC staff have reached an understanding on an approach to resolve the Piping DAC. The NRC has agreed to onsite technical review meetings to review the information and analyses prepared by Westinghouse to resolve the Piping DAC. Westinghouse expects that the results of the NRC reviews will demonstrate that a Piping DAC is not required and does not need to be included in the AP1000 Design Control Document when the Design Certification amendment is approved.

The proposed changes include the deletion of Table 1-2 of the DCD Introduction. So that this useful summary of methods and criteria is not lost from the Design Control Document a table containing this information will be added to Section 3.9. This information will be available for the NRC to reference if appropriate for any SER confirmatory item needed until the review of piping analyses is complete.

The proposed changes also revise portions of the Design Control Document that Westinghouse included in Revision 16 to close a COL Information Item related to the review of ASME Code design specification and design reports. The NRC staff did not accept the approach to closure of the COL Information Item

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included in Revision 16. Westinghouse has substantially completed the design documentation for ASME Code components and piping and Westinghouse and the NRC have scheduled an onsite technical review of design specifications and design reports of ASME components. This review will provide justification to close the COL Information Item for the review of design specifications and design reports.

Questions or requests for additional information related to the content and preparation of this letter should be directed to Westinghouse. Please send copies of such questions or requests to the prospective applicants for combined licenses referencing the AP1000 Design Certification. A representative for each applicant is included on the cc: list of this letter.

Very truly yours,

Robert Sisk, Manager
Licensing and Customer Interface
Regulatory Affairs and Standardization

/Enclosure

1. Changes to Remove Piping DAC from DCD

cc:

B. Gleaves	-	U.S. NRC	1E
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ENCLOSURE 1

Changes to Remove Piping DAC from DCD

Changes to Remove Piping DAC from DCD

Revise Section 4 of the DCD Introduction as follows:

~~**4.0 References**~~

~~1. APP-GW-GLR-013, "Safety Class Piping Design Specifications and Design Reports Summary."~~

Revise the last entry in Table 1-1 in Section 1 of the DCD Introduction as follows:

Table 1-1 (Cont.)
Index of AP1000 Tier 2 Information Requiring NRC Approval for Change

Item	**Expiration at First Full Power**	Tier 2 Reference
WCAP-14651, "Integration of Human Reliability Analysis with Human Factors Engineering Design Implementation Plan," Rev 2	No	18.12.5
Piping Design Analysis Criteria (DAC)	~~Yes~~Resolved	See ~~DCD Intro,~~ Table ~~1-2~~3.9-19

NOTE: The mark-up for Table 1-1 above and Table 1-2 following starts with information that was included in APP-GW-GLR-134, Rev. 2 (TR-134)

Revise Table 1-2 in the DCD introduction as follows:

Table 1-2 Not used
~~Piping Design Acceptance Criteria~~

~~Commitment~~	~~Tier 2 Reference~~
~~ASME Code and Code Cases for AP1000 piping and pipe support design~~	~~Table 3.9-9, Table 3.9-10, 5.2.1.1, 5.2.1.2, Table 5.2-3~~
~~Analysis Methods; experimental stress analysis, independent support motion, inelastic analysis, non-seismic/seismic interaction, buried piping~~	~~3.7.3.9, 3.7.3.12, 3.7.3.13, 3.9.1.3, 3.9.3.1.5~~
~~Piping Modeling; piping benchmark program, decoupling criteria~~	~~3.6.2.1.1.1, 3.6.2.1.1.2, 3.6.2.1.1.3, 3.7.3.8.2.1, 3.9.1.2~~
~~Pipe stress analysis criteria; loading and load combinations, damping values, combination of modal responses, high frequency modes, thermal oscillations in piping connected to the reactor coolant system, thermal stratification, safety-related valve design, installation and testing, functional capability, combination of inertial and seismic motion effects, welded attachments, modal damping for composite structures, minimum temperature for thermal analysis~~	~~3.6.2.2, 3.6.3.3, 3.7.2.14, 3.7.3.2, 3.7.3.7, 3.7.3.8.2.1, 3.7.3.9, Table 3.7.1-1, 3.9.3.1.2, 3.9.3.1.5, 3.9.3.3, Table 3.9-5, Table 3.9-6, Table 3.9-7, Table 3.9-8, Table 3.9-9, Table 3.9-10, Table 3.9-11~~
~~Pipe support criteria; applicable codes, jurisdictional boundaries, pipe support baseplate and anchor bolt design, use of energy absorbers and limit stops, pipe support stiffnesses, seismic self-weight excitation, design of supplementary steel, considerations of friction forces, pipe support gaps and clearances, instrument line support criteria~~	~~3.9.1.2, 3.9.3.4, 3.9.3.5~~
~~Equivalent Static Load Method of Analysis~~	~~3.7.3.5, 3.7.3.5.1, 3.7.3.5.2~~
~~Three Components of Earthquake Motion~~	~~3.7.3.6~~
~~Left-Out-Force Method Used in PIPESTRESS Program~~	~~3.7.3.7.1.1~~
~~SRP 3.7.2 Method for High-Frequency Modes~~	~~3.7.3.7.1.2~~
~~Combination of Low-Frequency Modes~~	~~3.7.3.7.2~~
~~Modeling Methods and Analytical Procedures for Piping Systems~~	~~3.7.3.8, 3.7.3.8.1, 3.7.3.8.2.2, 3.7.3.8.3, 3.7.3.8.4~~
~~Seismic Anchor Motions~~	~~3.7.3.9~~
~~Methods Used to Account for Torsional Effects of Eccentric Masses~~	~~3.7.3.11~~
~~Design Methods of Piping to Prevent Adverse Spatial Interactions~~	~~3.7.3.13.4, 3.7.3.13.4.1, 3.7.3.13.4.2, 3.7.3.13.4.3~~
~~Analysis Procedure for Damping~~	~~3.7.3.15~~
~~Time History Analysis of Piping Systems~~	~~3.7.3.17~~
~~Design Transients~~ ~~Use of NRC Bulletins 88-08 and 88-11~~	~~3.9.1.1~~

~~Table 1-2 (Cont.)~~
~~Piping Design Acceptance Criteria~~

~~Commitment~~	~~Tier 2 Reference~~
~~Loads for Class 1 Components and Core/Component Supports~~	~~3.9.3.1.2~~
~~Use of Square Root Sum of the Squares Method for SSE plus Pipe Rupture~~	~~3.9.3.1.3~~
~~Analysis of Reactor Coolant Loop Piping~~	~~3.9.3.1.4~~
~~ASME Classes 1, 2, and 3 Piping~~ ~~Use of ASME Code, Section III~~	~~3.9.3.1.5~~
~~Design of Spring Loaded Safety Valves~~	~~3.9.3.3.1~~
~~Design and Analysis Requirement for Open and Closed Discharge Systems~~	~~3.9.3.3.3~~
~~Component and Piping Supports for Dynamic Loading~~	~~3.9.3.4~~
~~Class 2 and 3 Component Supports~~ ~~Use of ASME Section III~~	~~3.9.3.4.2~~
~~Piping System Seismic Stress Analysis~~	~~3.9.3.4.3~~
~~Design Report for ASME Class 1, 2, and 3 Piping~~	~~3.9.8.2~~
~~Integrity of Nonsafety Related CVS Piping Inside Containment~~ ~~Compliance with 10 CFR 50.55a and ASME B31.1 Code~~	~~5.2.1.1~~

Add the following to Subsection 3.9.3.1.5

The methods and criteria used in the design and analysis of the ASME Code Class 1, 2, and 3 piping are itemized in Table 3.9-19. These methods are included in the design specifications and design reports required for piping in Subsection 3.9.8.2. Use of these methods is documented in both as-designed and as-built reports.

Revise Subsection 3.9.8.2 as follows:

3.9.8.2 Design Specifications and Reports

The Combined License information requested in this subsection has been partially addressed by design completion activities~~in several technical reports,~~ and the applicable changes are incorporated into the DCD. The work that has been completed is summarized in the two following paragraphs:

~~The~~ As-designed design specifications and design reports for the major ASME Code, Section III components and piping are available for NRC review. ~~audit via the technical reports listed in Table 3.9-19.~~ Design Specifications and selected design analysis information ~~are also available~~ for ASME Code, Section III valves and auxiliary components are available for NRC review.

The consistency of the reactor vessel core support materials relative to known issues of irradiation-assisted stress corrosion cracking or void swelling has been evaluated and addressed in APP-GW-GLR-035 (Reference 21).

COL Holder Activities

After a Combined License is issued, the following activities are completed by the COL holder:

~~A Combined License holder referencing the AP1000 design will have available for NRC audit the design specifications and as-designed design reports prepared for major ASME Section III components and ASME Code, Section III piping.~~

~~A Combined License holder referencing the AP1000 design will have available for NRC audit the design specifications prepared for ASME Section III auxiliary components and valves.~~

Reconciliation of the as-built piping (verification of the thermal cycling and stratification loadings considered in the stress analysis discussed in subsection 3.9.3.1.2) is completed by the COL holder after the construction of the piping systems and prior to fuel load (Reference 33).

The following words represent the original Combined License Information item commitment, which has been addressed as discussed above:

Combined License applicants referencing the AP1000 design will have available for NRC audit the design specifications and design reports prepared for ASME Section III components. Combined License applicants will address consistency of the reactor vessel core support materials relative to known issues of irradiation-assisted stress corrosion cracking or void swelling (see subsection 4.5.2.1). [*The design report for the ASME Class 1, 2, and 3 piping will include the reconciliation of the as-built piping as outlined in subsection 3.9.3. This reconciliation includes verification of the thermal cycling and stratification loadings considered in the stress analysis discussed in subsection 3.9.3.1.2.*]*

Revise References 22 through 33 as follows:

22. Not Used ~~APP-GW-GLR-049, "Accumulator Design Specification and Design Report Summary," Westinghouse Electric Company LLC.~~

23. Not Used ~~APP-GW-GLR-048, "Core Makeup Tank Design Specification and Design Report Summary," Westinghouse Electric Company LLC.~~

24. Not Used ~~APP-GW-GLR-057, "Control Rod Drive Mechanism Design Specification and Design Reports Summary," Westinghouse Electric Company LLC.~~

25. Not Used ~~APP-GW-GLR-054, "In-Core Instrumentation Guide Tube Design Requirements and Design Report Summary," Westinghouse Electric Company LLC.~~

26. Not Used ~~APP-GW-GLR-051, "Pressurizer Design Specification and Design Report Summary," Westinghouse Electric Company LLC.~~

27. Not Used ~~APP-GW-GLR-050, "Reactor Internals Design Specification and Design Reports Summary," Westinghouse Electric Company LLC.~~

28. Not Used ~~APP-GW-GLR-052, "Reactor Coolant Pump Design Specification and Design~~

~~Report Summary," Westinghouse Electric Company LLC.~~

29. Not Used ~~APP-GW-GLR-053, "Passive RHR Heat Exchanger Design Specification and Reports Summary," Westinghouse Electric Company LLC.~~

30. Not Used ~~APP-GW-GLR-055, "Reactor Vessel Design Specification and Design Report Summary," Westinghouse Electric Company LLC.~~

31. Not Used ~~APP-GW-GLR-056, "Steam Generator Design Specification and Design Report Summary," Westinghouse Electric Company LLC.~~

32. Not Used ~~APP-GW-GLR-013, "Safety Class Piping Design Specifications and Design Reports Summary," Westinghouse Electric Company LLC.~~

Delete the following Table 3.9-19

~~Table 3.9-19~~

~~TECHNICAL REPORTS SUMMARIZING DESIGN SPECIFICATION AND DESIGN REPORTS FOR ASME SECTION III COMPONENTS AND PIPING~~

~~Document Number~~	~~Document Title~~
~~APP-GW-GLR-013, Reference 32~~	~~Safety Class Piping Design Specifications and Design Reports Summary~~
~~APP-GW-GLR-048, Reference 23~~	~~Core Makeup Tank Design Specification and Design Report Summary~~
~~APP-GW-GLR-049, Reference 22~~	~~Accumulator Design Specification and Design Report Summary~~
~~APP-GW-GLR-050, Reference 27~~	~~Reactor Internals Design Specification and Design Reports Summary~~
~~APP-GW-GLR-051, Reference 26~~	~~Pressurizer Design Specification and Design Report Summary~~
~~APP-GW-GLR-052, Reference 28~~	~~Reactor Coolant Pump Design Specification and Design Report Summary~~
~~APP-GW-GLR-053, Reference 29~~	~~Passive RHR Heat Exchanger Design Specification and Reports Summary~~
~~APP-GW-GLR-054, Reference 25~~	~~In-Core Instrumentation Guide Tube Design Requirements and Design Report Summary~~
~~APP-GW-GLR-055, Reference 30~~	~~Reactor Vessel Design Specification and Design Report Summary~~
~~APP-GW-GLR-056, Reference 31~~	~~Steam Generator Design Specification and Design Report Summary~~
~~APP-GW-GLR-057, Reference 24~~	~~Control Rod Drive Mechanism Design Specification and Design Reports Summary~~

Add Table 3.9-19 as follows:

Table 3.9-19
Critical Piping Design Methods and Criteria (Piping Design ~~Acceptance~~ Criteria)

Commitment	Tier 2 Reference
ASME Code and Code Cases for AP1000 piping and pipe support design	Table 3.9-9, Table 3.9-10, 5.2.1.1, 5.2.1.2, Table 5.2-3
Analysis Methods; experimental stress analysis, independent support motion, inelastic analysis, non-seismic/seismic interaction, buried piping	3.7.3.9, 3.7.3.12, 3.7.3.13, 3.9.1.3, 3.9.3.1.5
Piping Modeling; piping benchmark program, decoupling criteria	3.6.2.1.1.1, 3.6.2.1.1.2, 3.6.2.1.1.3, 3.7.3.8.2.1, 3.9.1.2
Pipe stress analysis criteria; loading and load combinations, damping values, combination of modal responses, high frequency modes, thermal oscillations in piping connected to the reactor coolant system, thermal stratification, safety-related valve design, installation and testing, functional capability, combination of inertial and seismic motion effects, welded attachments, modal damping for composite structures, minimum temperature for thermal analysis	3.6.2.2, 3.6.3.3, 3.7.2.14, 3.7.3.2, 3.7.3.7, 3.7.3.8.2.1, 3.7.3.9, Table 3.7.1-1, 3.9.3.1.2, 3.9.3.1.5, 3.9.3.3, Table 3.9-5, Table 3.9-6, Table 3.9-7, Table 3.9-8, Table 3.9-9, Table 3.9-10, Table 3.9-11
Pipe support criteria; applicable codes, jurisdictional boundaries, pipe support baseplate and anchor bolt design, use of energy absorbers and limit stops, pipe support stiffnesses, seismic self-weight excitation, design of supplementary steel, considerations of friction forces, pipe support gaps and clearances, instrument line support criteria	3.9.1.2, 3.9.3.4, 3.9.3.5
Equivalent Static Load Method of Analysis	3.7.3.5, 3.7.3.5.1, 3.7.3.5.2
Three Components of Earthquake Motion	3.7.3.6
Left-Out-Force Method Used in PIPESTRESS Program	3.7.3.7.1.1
SRP 3.7.2 Method for High-Frequency Modes	3.7.3.7.1.2
Combination of Low-Frequency Modes	3.7.3.7.2
Modeling Methods and Analytical Procedures for Piping Systems	3.7.3.8, 3.7.3.8.1, 3.7.3.8.2.2, 3.7.3.8.3, 3.7.3.8.4
Seismic Anchor Motions	3.7.3.9
Methods Used to Account for Torsional Effects of Eccentric Masses	3.7.3.11
Design Methods of Piping to Prevent Adverse Spatial Interactions	3.7.3.13.4, 3.7.3.13.4.1, 3.7.3.13.4.2, 3.7.3.13.4.3
Analysis Procedure for Damping	3.7.3.15
Time History Analysis of Piping Systems	3.7.3.17
Design Transients Use of NRC Bulletins 88-08 and 88-11	3.9.1.1

Table 3.9-19 (Cont.)
Critical Piping Design Methods and Criteria (Piping Design ~~Acceptance~~ Criteria)

Commitment	Tier 2 Reference
Loads for Class 1 Components and Core/Component Supports	3.9.3.1.2
Use of Square-Root-Sum-of-the-Squares Method for SSE plus Pipe Rupture	3.9.3.1.3
Analysis of Reactor Coolant Loop Piping	3.9.3.1.4
ASME Classes 1, 2, and 3 Piping Use of ASME Code, Section III	3.9.3.1.5
Design of Spring-Loaded Safety Valves	3.9.3.3.1
Design and Analysis Requirement for Open and Closed Discharge Systems	3.9.3.3.3
Component and Piping Supports for Dynamic Loading	3.9.3.4
Class 2 and 3 Component Supports Use of ASME Section III	3.9.3.4.2
Piping System Seismic Stress Analysis	3.9.3.4.3
Design Report for ASME Class 1, 2, and 3 Piping	3.9.8.2
Integrity of Nonsafety-Related CVS Piping Inside Containment Compliance with 10 CFR 50.55a and ASME B31.1 Code	5.2.1.1