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Your ref: Docket No. 52-006  
Our ref: DCP\_NRC\_003020

August 23, 2010

Subject: AP1000 Response to Open Item (SRP3)

Westinghouse is submitting a response to the NRC Open Item (OI) on SRP Section 3. This open item response is submitted in support of the AP1000 Design Certification Amendment Application (Docket No. 52-006). The information included in this response is generic and is expected to apply to all COL applications referencing the AP1000 Design Certification and the AP1000 Design Certification Amendment Application.

Enclosure 1 provides the response for the following OI(s):

OI-SRP3.12-EMB-04 R2

Questions or requests for additional information related to the content and preparation of this response 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,

A handwritten signature in black ink, appearing to read 'Robert Sisk', written over a horizontal line.

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

/Enclosure

1. Response to Open Item on SRP Section 3

cc:	D. Jaffe	- U.S. NRC	1E
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ENCLOSURE 1

Response to Open Item on SRP Section3

# AP1000 DESIGN CERTIFICATION REVIEW

## Response to SER Open Item (OI)

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OI Response Number: OI-SRP3.12-EMB-04  
Revision: 2

### Question:

### Revision 2:

During NRC review of open item RAI-SRP3.12-EMB1-09, it was noted that there is reference to COL information item 3.9-7 which does not exist in DCD Rev. 17. Westinghouse must submit a change to add the new COL information item 3.9-7 to Table 1.8-2 of the DCD along with any other requisite clarifications.

### Revisions 0 and 1:

The staff reviewed the proposed changes in the introduction of DCD Revision 17 and related Tier 2 Subsection 3.9.8.2 and Table 3.9-19. The staff determined that risk-significant piping design packages have to be completed in order to resolve or remove reference to piping DAC.

DCD Subsection 3.9.8.2 was revised to reflect the design completion by indicating that as designed design specifications and design report for the major ASME Code, Section III components and piping are available for NRC review.

During the period October 20 - 24, 2008, the staff performed an on-site review, at the Westinghouse headquarters, of AP1000 ASME Class 1 piping and support design with the intent to resolve piping DAC. During this review, the staff found that the applicant had not completed risk-significant ASME Class 1 piping analysis packages. On the basis that the risk significant piping analyses had not been completed, the staff cannot remove piping DAC at this time. The on-site review summary is documented in a letter dated December 30, 2008 (ADAMS Accession Number ML083500308).

By letter dated January 19, 2009 (ADAMS Accession Number ML090220273), the applicant submitted AP1000 piping DAC Analysis Schedule. In this letter, the applicant stated that the AP1000 ASME Code, Section III, Class 1, 2, and 3 piping analysis packages are rescheduled to be completed by June 30, 2009. The applicant will inform the staff when it is ready for another on-site review for Class 1, 2, and 3 risk-significant piping analysis to complete resolution of the piping DAC. This is **Open Item OI-SRP3.12-EMB-4**.

### Reference:

1. ADAMS "Chapter 3 SER," ML092150664.

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### Westinghouse Response:

#### Revision 2:

Westinghouse concurs with adding the new COL reference to Table 1.8-2 DCD. A revised Table 1.8-2 is included in the attached DCD markups. The other requisite information and DCD markups were included in the Revision 1 response to this RAI and remain unchanged for Revision 2.

#### Revision 1:

This OI response is revised to address NRC comments on the Rev. 0 response. A roadmap for closure of DAC / ITAAC is included in Chapter 14 (Appendix 14.3A) of the DCD. The as-designed piping analysis and as-designed pipe rupture hazards analysis COL information items will be closed post design certification in accordance with the DAC / ITAAC closure process options outlined in Appendix 14.3A and in RG 1.206. NEI 08-01 is no longer referenced in this OI response as the basis for closure of the piping DAC.

Additionally, the content of the piping packages to be reviewed to demonstrate all aspects of piping design has been modified. Rather than limiting the review to the 48 lines specified in Table 3.9-20 documented in the Rev. 0 response to this Open Item, all Class 1 piping larger than one inch in diameter, in addition to the Class 2/3 packages provided in Table 3.9-20, will be completed and reviewed to close the piping DAC.

A meeting was held on 1/27/10 between the NRC and WEC at the Westinghouse Twinbrook Office to discuss the licensing approach for the Piping DAC to be implemented for the AP1000 Design Certification Amendment (DCA). At this meeting, WEC indicated that it would not be able to complete the piping analysis for the previously specified risk significant piping packages to support the DCA schedule. The staff indicated in this letter that a successful review of this sample of piping would form the basis to resolve the Piping Design Acceptance Criteria (DAC). The staff indicated that this graded approach of review can be used to demonstrate all aspects of the piping design for AP1000.

WEC proposed that the Piping DAC become a COL Information Item (3.9-7) in the DCD for the DCA. COL information item 3.9-7 will state that the applicant needs to complete the as-designed piping analysis for the identified risk significant piping packages to close the Piping DAC. The COL information item will be addressed by the COL applicant in a manner that complies with NRC guidance provided in Reg Guide 1.206, and outlined in Appendix 14.3A of the DCD.

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Westinghouse will continue to work towards completion of the risk significant piping packages, and will submit a licensing topical report to the staff documenting completion of the piping packages chosen to demonstrate the piping design and referencing the applicable design documents. The report would support closure of the COL information item for the reference standard plant. WEC may request that the NRC audit the design documents and document findings in a safety evaluation which, in conjunction with the inspection reports written on the R-COLA, would become a reference for documenting closure of the COL information item for subsequent COL applicants under the concept of "one issue, one review, one position," in NRC guidance.

This approach was generally agreed upon between WEC and the NRC at the meeting on 1/27/10, and it was decided that the COL information item in the DCD, in conjunction with a license condition and design ITAAC provided in the COLA, would establish the basis for closure of the Piping DAC.

With the Piping DAC being addressed as COL information item 3.9-7, it is no longer an open item for the Design Certification Amendment. Westinghouse proposes that SER Open item OI-SRP3.12-EMB-4 be considered closed.

Additionally, COL information item 3.9-2 is modified to state that the COL applicant will make available for NRC review design specifications and design reports for ASME Section III piping. It had previously been revised to document that this information is available for NRC review at the time of Design Certification.

### Design Control Document (DCD) Revision:

Tier 2, Subsection 1.8 is modified as follows (includes Revision 0, 1, and 2 changes):

Table 1.8-2 (Sheet 4 of 13)					
SUMMARY OF AP1000 STANDARD PLANT COMBINED LICENSE INFORMATION ITEMS					
Item No.	Subject	Subsection	Addressed by Westinghouse Document	Action Required by COL Applicant	Action Required by COL Holder

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3.8-2	Deleted Passive Containment Cooling System Water Storage Tank Examination	Deleted	APP-GW-GLR-021	N/A	N/A
3.8-3	Deleted As-Built Summary Report	Deleted	APP-GW-GLR-021	N/A	N/A
3.8-4	Deleted In-Service Inspection of Containment Vessel	Deleted	APP-GW-GLR-021	N/A	N/A
3.9-1	Reactor Internal Vibration Response	3.9.8.1	WCAP-16687-P	No	No
3.9-2	Design Specification and Reports	3.9.8.2	APP-GW-GLR-021	No	Yes
3.9-3	Snubber Operability Testing	3.9.8.3	N/A	Yes	–
3.9-4	Valve Inservice Testing	3.9.8.4	APP-GW-GLN-020	Yes	–
3.9-5	Surge Line Thermal Monitoring	3.9.8.5	N/A	Yes	–
3.9-6	Piping Benchmark Program	3.9.8.6	APP-GW-GLR-006	No	No
3.9-7	As-Designed Piping Analysis	3.9.8.7	Various	Yes	Yes
3.10-1	Deleted Experience-Based Qualification	Deleted		N/A	N/A
3.11-1	Equipment Qualification File	3.11.5	APP-GW-GLN-110	No	Yes
4.2-1	Changes to Reference Reactor Design	4.2.5	APP-GW-GLR-059	No	No
4.3-1	Changes to Reference Reactor Design	4.3.4	APP-GW-GLR-059 APP-GW-GLR-119	No	No
4.4-1	Changes to Reference Reactor Design	4.4.7.1	APP-GW-GLR-059	No	No

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Tier 2, Subsection 3.9.8 is modified as follows (includes Rev. 0 and Rev. 1 changes):

### 3.9.8.2 Design Specifications and Reports

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

As-designed design specifications and design reports for the major ASME Code, Section III components ~~and piping~~ are available for NRC review. Design Specifications and selected design analysis information 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~~-Applicant Activities

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

Combined License applicants referencing the AP1000 design will have available for NRC review design specifications and design reports for ASME Section III piping. The availability of the design reports will be identified to the NRC. 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*

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*reconciliation includes verification of the thermal cycling and stratification loadings considered in the stress analysis discussed in subsection 3.9.3.1.2.]\**

### 3.9.8.7 As-Designed Piping Analysis

The following activity will be completed by the COL applicant:

Combined License applicants referencing the AP1000 design will complete the as-designed piping analysis (DAC) for the piping lines chosen to demonstrate all aspects of the piping design. A design report referencing the as-designed piping calculation packages, including ASME Section III piping analysis, support evaluations and piping component fatigue analysis for Class 1 piping using the methods and criteria outlined in Table 3.9-19 will be made available for NRC review. The availability of the piping design information and design reports will be identified to the NRC. Combined License applicants may address this item in accordance with the process options for DAC / ITAAC closure outlined in Appendix 14.3A.

The piping packages chosen to demonstrate the AP1000 piping design are identified to be any piping package containing Class 1 piping larger than one inch in diameter plus the additional packages identified in Table 3.9-20.

Note: Piping packages included in Table 3.9-20 are generally Class 2/3 lines, with the exception of APP-RCS-PLR-230, which contains the one-inch Class 1 reactor head vent piping.

Insert Table 3.9-20 into Tier 2, Subsection 3.9 (includes Rev. 0 and Rev. 1 changes):

Table 3.9-20			
PIPING PACKAGES CHOSEN TO DEMONSTRATE PIPING DESIGN FOR PIPING DAC CLOSURE (In addition to Class 1 lines larger than one inch in diameter)			
ASME Class	Inside/Outside Containment (IC/OC)	Line(s) Description	Piping Package Number
2	IC	Hot Leg 2 I&C	APP-RCS-PLR-210
1,3	IC	Reactor Head Vent	APP-RCS-PLR-230

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Table 3.9-20

PIPING PACKAGES CHOSEN TO DEMONSTRATE PIPING DESIGN FOR PIPING DAC CLOSURE  
(In addition to Class 1 lines larger than one inch in diameter)

ASME Class	Inside/Outside Containment (IC/OC)	Line(s) Description	Piping Package Number
2	IC	Hot Leg 1 I&C	APP-RCS-PLR-260
2	IC	Hot Leg 1 Sampling	APP-RCS-PLR-460
2	IC	Hot Leg 2 Sampling	APP-RCS-PLR-470
2	IC	Pressurizer Sampling	APP-RCS-PLR-480
2	IC	Pressurizer I&C	APP-RCS-PLR-510
2/3	IC	Component Cooling from Penetration C01 IRC	APP-CCS-PLR-040
2/3	IC	Component Cooling from Penetration C02 IRC	APP-CCS-PLR-050
2/3	IC	CVS Makeup from Penetration C03 IRC	APP-CVS-PLR-090
2/3	IC	CVS Letdown from Penetration 002 IRC 2	APP-CVS-PLR-100
2/3	IC	ACC-A/B3 Makeup	APP-PXS-PLR-620
2/3	IC	SFS From Penetration C01	APP-SFS-PLR-600
2/3	IC/OC	Feedwater to SG 01	APP-SGS-PLR-010
2/3	IC/OC	Feedwater to SG 02	APP-SGS-PLR-020
2/3	IC/OC	Main Steam to SG 01	APP-SGS-PLR-030
2/3	IC/OC	Main Steam to SG 02	APP-SGS-PLR-040
2/3	IC	SG01 Blowdown to Penetration C03A	APP-SGS-PLR-070
2/3	IC	SG02 Blowdown to Penetration C03B	APP-SGS-PLR-080
2/3	IC	SG01 Startup Feed Water from Penetration C05A	APP-SGS-PLR-310
2/3	IC	SG02 Startup Feed Water from Penetration C05B	APP-SGS-PLR-320
2/3	IC	VWS Supply from Containment Penetration C02	APP-VWS-PLR-500
2/3	IC	VWS Return to Containment Penetration C01	APP-VWS-PLR-530
2/3	OC	Component Cooling from Penetration C01 ORC	APP-CCS-PLR-810
2/3	OC	Component Cooling from Penetration C02 ORC	APP-CCS-PLR-820
2/3	OC	CVS Makeup from Penetration C03 ORC	APP-CVS-PLR-530
2/3	OC	PCS Recirculation, DWS Supply, and FPS Supply	APP-PCS-PLR-100
2/3	OC	From Spent Fuel to RNS and PCCWST Drain	APP-RNS-PLR-100
2/3	OC	Normal RHR to Heat Exchangers and Pumps from Containment Penetrations C01 and C02	APP-RNS-PLR-170
2/3	OC	Spent Fuel Cooling Module R3-65	APP-SFS-PLR-350
2/3	OC	SG01 Startup Feedwater to Penetration C05A	APP-SGS-PLR-110
2/3	OC	SG02 Startup Feedwater to Penetration C05B	APP-SGS-PLR-120
2/3	OC	Nonradioactive Vent Return from Main Control Room	APP-VBS-PLR-010

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Table 3.9-20

PIPING PACKAGES CHOSEN TO DEMONSTRATE PIPING DESIGN FOR PIPING DAC CLOSURE  
(In addition to Class 1 lines larger than one inch in diameter)

ASME Class	Inside/Outside Containment (IC/OC)	Line(s) Description	Piping Package Number
2/3	OC	Nonradioactive Vent Supply to Main Control Room	APP-VBS-PLR-020
2/3	OC	VWS Supply to Containment Penetration C02	APP-VWS-PLR-910
2/3	OC	VWS Return from Containment Penetration C01	APP-VWS-PLR-920

Insert Appendix 14.3A into Tier 2, Section 14.3:

### 14.3A Design Acceptance Criteria / ITAAC Closure Process

DAC (Design Acceptance Criteria) are a set of prescribed limits, parameters, procedures, and attributes upon which the NRC relies, in a limited number of technical areas, in making a final safety determination to support a design certification. DAC are to be objective (measurable, testable, or subject to analysis using pre-approved methods), and must be verified as a part of the ITAAC performed to demonstrate that the as-built facility conforms to the certified design. (SECY 92-053)

There are three process options for DAC / ITAAC resolution:

- Resolve through amendment to design certification
- Resolve as part of COL review
- Resolve after COL is issued

In the first two options, the applicant will submit the design information and the NRC will document its review in a safety evaluation. In the third option, the COL holder notifies the NRC of availability of design information and the staff will document its review in an inspection report.

Should the third option be implemented for the first standard AP1000 plant, subsequent COL applicants may reference the first standard plant closure documentation and close the DAC / ITAAC under the concept of "one issue, one review, one position," identified in NRC guidance.

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Additionally, Westinghouse Electric Company may submit licensing topical reports for NRC review of the material supporting the DAC / ITAAC closure and request that the NRC issue a safety evaluation in conjunction with a closure letter or inspection report concluding that the acceptance criteria of the DAC / ITAAC have been met. Subsequent COL applicants may reference these reports and NRC closure documents in effort to close the DAC / ITAAC.

For technical areas where DAC / ITAAC applies in the design certification rule, COL applicants will provide an ITAAC and associated closure schedule indicating the approach to be applied. For subsequent COL applicants following the first standard AP1000 plant, the indication could be to reference the existing DAC / ITAAC closure documentation for the first standard plant.

NRC guidance for DAC / ITAAC is provided in RG 1.206, Section C.III.5. Further information on the staff's position of DAC / ITAAC being used as part of the 10CFR Part 52 review process is provided in SECY-92-053.

**PRA Revision:**

None

**Technical Report (TR) Revision:**

None