



Westinghouse Electric Company
Nuclear Power Plants
P.O. Box 355
Pittsburgh, Pennsylvania 15230-0355
USA

U.S. Nuclear Regulatory Commission
ATTENTION: Document Control Desk
Washington, D.C. 20555

Direct tel: 412-374-6306
Direct fax: 412-374-5005
e-mail: sterdia@westinghouse.com

Your ref: Project Number 740
Our ref: DCP/NRC1941

June 14, 2007

Subject: AP1000 COL Response to Requests for Additional Information (TR 6)

In support of Combined License application pre-application activities, Westinghouse is submitting a revised response to the NRC request for additional information (RAI) on AP1000 Standard Combined License Technical Report 6, APP-GW-GLR-021, AP1000 As-Built COL Information Items. This RAI response is submitted as part of the NuStart Bellefonte COL Project (NRC Project Number 740). The information included in the response is generic and is expected to apply to all COL applications referencing the AP1000 Design Certification.

A revised response is provided for TR6-1, transmitted in an NRC letter from Steven D. Bloom to Andrea Sterdis, dated August 8, 2006, Subject: Westinghouse AP1000 Combined License (COL) Pre-application Technical Report 6 – Request for Additional Information (TAC No. MD2174). Response Revision 1 was provided as an enclosure to Westinghouse letter DCP/NRC1867 dated April 13, 2007. Revision 2 is in response to discussions in a phone call with the NRC.

Pursuant to 10 CFR 50.30(b), the response to the request for additional information on Technical Report 6, numbered RAI-TR06-001, Revision 2 is submitted as Enclosure 1 under the attached Oath of Affirmation.

Questions or requests for additional information related to the content and preparation of these responses 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 that reads "D. J. Hurling for".

A. Sterdis, Manager
Licensing and Customer Interface
Regulatory Affairs and Standardization

/Attachment

1. "Oath of Affirmation," dated June 14, 2007

/Enclosure

1. Response to Request for Additional Information on Technical Report No. 6
RAI-TR06-001, Rev. 2

cc:	D. Jaffe	- U.S. NRC	1E	1A
	E. McKenna	- U.S. NRC	1E	1A
	G. Curtis	- TVA	1E	1A
	P. Grendys	- Westinghouse	1E	1A
	P. Hastings	- Duke Power	1E	1A
	C. Ionescu	- Progress Energy	1E	1A
	D. Lindgren	- Westinghouse	1E	1A
	A. Monroe	- SCANA	1E	1A
	M. Moran	- Florida Power & Light	1E	1A
	C. Pierce	- Southern Company	1E	1A
	E. Schmiech	- Westinghouse	1E	1A
	G. Zinke	- NuStart/Entergy	1E	1A

ATTACHMENT 1

“Oath of Affirmation”

ATTACHMENT 1

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

In the Matter of:)
NuStart Bellefonte COL Project)
NRC Project Number 740)

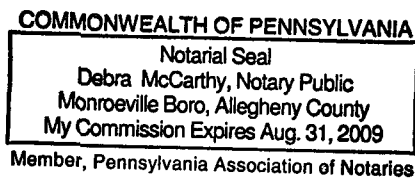
APPLICATION FOR REVIEW OF
"AP1000 GENERAL COMBINED LICENSE INFORMATION"
FOR COL APPLICATION PRE-APPLICATION REVIEW

B. W. Bevilacqua, being duly sworn, states that he is Vice President, New Plants Engineering, for Westinghouse Electric Company; that he is authorized on the part of said company to sign and file with the Nuclear Regulatory Commission this document; that all statements made and matters set forth therein are true and correct to the best of his knowledge, information and belief.



B. W. Bevilacqua
Vice President
New Plants Engineering

Subscribed and sworn to
before me this 14th day
of June 2007.



Debra McCarthy
Notary Public

ENCLOSURE 1

Response to Request for Additional Information on Technical Report No. 6

RAI-TR06-001, Rev. 2

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RAI Number: RAI-TR06-001
Revision: 2

Question:

Westinghouse proposed to modify the wording of Combined License (COL) Information Item 3.9-2 in AP1000 Design Control Document (DCD) Section 3.9.8.2. COL Information Item 3.9-2 specifies that COL applicants referencing the AP1000 design have available for NRC audit the specification and design reports for ASME Section III components. The basis for Westinghouse's proposed change is that COL information item also refers to as-built information for piping which will not be available at the time of the COL application. Westinghouse's proposed modification adds the following sentence to DCD Section 3.9.8.2.

"The final design reports including the reconciliation of the as-built piping are completed by the COL holder after the construction of the piping systems and prior to fuel load."

The staff is concerned that this added wording could be interpreted to mean that the design stress analysis of ASME Section III piping components do not have to be available at the time of the COL application. This interpretation would not be consistent with the wording of COL Action Item 3.9.2.4-1 discussed in Final Safety Evaluation Report (FSER) Section 3.12.5.9. COL Action Item 3.12.5.9 does not refer to reconciliation of the piping analysis with as-built information. The staff agrees the as-built piping information will not be available at the time of the COL application. In order to avoid possible confusion, the staff requests that Westinghouse revise DCD section 3.9.8.2 to be consistent with the wording used for COL Action Item 3.9.2.4-1 as-discussed in FSER Section 3.12.5.9

Westinghouse Response:

COL Information Item 3.9-2 explicitly identifies that verification of thermal cycling and stratification loadings is included in the reconciliation of as-built piping. The discussion in 3.12.5.9 (page 3-276) of the FSER (NUREG-1793, Reference 1) implies that as-built information is required by the use of the phrase final stress analysis. Also the revised response to RAI 210.049 (Reference 2) cited in the FSER discussion explicitly identifies that the reconciliation is done using as-built information. The COL Information Item 3.9-2 included in Revision 15 of the DCD uses the exact words provided in the revised response to RAI 210-049 for the revision of the COL information item. The write-up in the FSER accepted that change. For these reasons Westinghouse understands that the portion of the information item relevant to piping analysis is a commitment for the as-built reconciliation.

However, Westinghouse notes that the criteria for evaluation of thermal cycling and stratification loadings are discussed in portions of the DCD, Subsection 3.9.1.1 and 3.9.3.1.2, that are designated as Tier 2* information. Westinghouse will include this evaluation as part of the generic portion of the ASME design report. This report will be prepared prior to fabrication using design information and it will be available for NRC review. The analysis supporting the generic

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portion of the ASME design reports covering the piping systems of interest is scheduled to be completed during the pre-application review phase.

As identified in RAI 210-049 during the design certification review, thermal cycling and stratification loadings will be addressed in the design reports for the following piping systems.

- Cold leg piping in the loop with passive RHR (during long-term PRHR operation)
- Pressurizer surge line
- Automatic depressurization system stage 4 lines
- Normal residual heat removal suction line
- Passive residual heat removal return line

Since the evaluation of thermal cycling and stratification loadings is included in the Tier 2* portion of the DCD, an additional COL information item requiring evaluation of thermal cycling and stratification loadings using the as-designed piping system configuration would be redundant and is not required.

The AP1000 Design Control Document use of the term COL applicant is applied inconsistently through DCD Revision 15. This term may mean the applicant at the time of application the applicant during NRC review of the application, or the COL holder. This ambiguity in the use of the term applicant resulted in a FSER action item that does not match with the intent of the COL Information item 3.9-1. Reconciliation of the as-built piping can not be performed during the review of the application but by the COL holder after the piping is fabricated and installed. Westinghouse does not intend to revise COL Information Item 3.9-1 to be consistent with FSER action items but will revise the Information Item to clarify the timing of the activities in the information item.

The SRP Section 3.9.3 indicates that the NRC audits design specifications and design reports of ASME Section III components to provide assurance that appropriate loads, criteria, and methods are used. The loads, criteria, and methods used on the AP1000 are described in the design control document. Including these loads, criteria, and methods in the design specification imposes these requirements on the respective components.

Documenting the design analysis in a Code design report represents the final activity in a series of activities that define and demonstrate the loads, criteria, and methods that are used in the design of the components. ITAAC for safety-related systems requires the completion of ASME Code design reports for safety-related components in the system. Therefore a COL Information Item is not required to assure that ASME Code design reports are completed. Although the ASME Code design reports require as-built information, much of the analysis prepared as part of the design process prior to fabrication is representative of the final stress analysis. NRC review and audit of design specification and selected pre-fabrication design analysis for the Westinghouse designed components in support of COL application review provides appropriate assurance that the loads, criteria, and methods used in the analysis are appropriate.

Westinghouse has focused its initial efforts to prepare design specifications and complete design analysis on major components that are specifically designed for the AP1000 plant.

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These components are the components for which reference to design summary reports was added in Revision 1 of this response. Valves and a few auxiliary components were not included in the list of design summary reports. These valves and other auxiliary components typically use designs that have been successfully designed and analyzed for use in operating nuclear power plants. This previous use reduces the need for review and audit to provide assurance that the design analysis satisfies the ASME code requirements.

The valves and auxiliary components constructed to ASME Code, Section III are largely chosen from established designs and procured later in the design and construction process from various suppliers. The suppliers are generally responsible for the design of these components. The timing of the selection and procurement of the valves and auxiliary components is such that NRC review and audit must focus on the design specifications that are developed by Westinghouse. The analysis of vendor supplied components will occur after the vendors have been selected as part of the project implementation.

In conversations with the NRC staff about Revision 0 of this response the staff indicated that they disagreed with the use of the term "final design reports" that was in a sentence proposed to be added to Subsection 3.9.8.2 in APP-GW-GLR-021. That term is not defined in the DCD, FSER, or the RAI response. Westinghouse agrees that the term "final design reports" is not needed to address the timing of the reconciliation of the as-built piping. The initial portion of the sentence including the term "final design reports" will be deleted from the proposed change to the DCD. The revised DCD markup is shown below.

Revision 0 of this response included a reference to the piping DAC. Since Westinghouse has submitted a technical report that would delete the DAC from the DCD, the references to the DAC have been changed.

Subsection 3.9.8.2 is affected by several technical reports in addition of APP-GW-GLR-021. The markup shown below includes the consolidated markup of 3.9.8.2 due to the impact of the other associated technical reports.

Revision 1 of this response added the discussion about the timing of design specifications and design analyses and the table being added to identify design report summaries and

Reference:

1. NUREG-1793, AP1000 Final Safety Evaluation Report, September 2004
2. AP1000 Design Certification RAI Number:210.049 (Response Revision 1)
3. APP- GW-GLR-700, AP100 Design Control Document, Revision 15

Design Control Document (DCD) Revision:

Revise DCD Subsection 3.9.8.2 as follows:

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3.9.8.2 Design Specifications and Reports

The Combined License information requested in this subsection has been addressed 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 design specification and design reports for the major ASME Code, Section III components and piping are available for NRC audit via the technical reports listed in Table 3.9-19. Design Specifications and selected design analysis information is also available for ASME Code, Section III valves and auxiliary components.

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:

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 Operating 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.*]*

Add the following references to DCD subsection 3.9.9

21. APP-GW-GLR-035, (WCAP-16620-P) "Consistency of Reactor Vessel Core Support Materials Relative to Known Issues of Irradiation-Assisted Stress Corrosion Cracking (IASCC) and Void Swelling for the AP1000 Plant," Westinghouse Electric Company LLC.
22. APP-GW-GLR-049, "Accumulator Design Specification and Design Report Summary," Westinghouse Electric Company LLC.
23. APP-GW-GLR-048, "Core Makeup Tank Design Specification and Design Report Summary," Westinghouse Electric Company LLC.

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24. APP-GW-GLR-057, "Control Rod Drive Mechanism Design Specification and Design Reports Summary." Westinghouse Electric Company LLC.
25. APP-GW-GLR-054, "In-Core Instrumentation Guide Tube Design Requirements and Design Report Summary," Westinghouse Electric Company LLC.
26. APP-GW-GLR-051, "Pressurizer Design Specification and Design Report Summary," Westinghouse Electric Company LLC.
27. APP-GW-GLR-050, "Reactor Internals Design Specification and Design Reports Summary," Westinghouse Electric Company LLC.
28. APP-GW-GLR-052, "Reactor Coolant Pump Design Specification and Design Report Summary," Westinghouse Electric Company LLC.
29. APP-GW-GLR-053, "Passive RHR Heat Exchanger Design Specification and Reports Summary," Westinghouse Electric Company LLC.
30. APP-GW-GLR-055, "Reactor Vessel Design Specification and Design Report Summary," Westinghouse Electric Company LLC.
31. APP-GW-GLR-056, "Steam Generator Design Specification and Design Report Summary," Westinghouse Electric Company LLC.
32. APP-GW-GLR-013, "Safety Class Piping Design Specifications and Design Reports Summary," Westinghouse Electric Company LLC.
33. APP-GW-GLR-021, "AP1000 As-Built COL Information Items," Westinghouse Electric Company LLC.

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Add Table 3.9-19 to the DCD as follows:

<u>Table 3.9-19</u>	
<u>Technical Reports Summarizing Design Specification and Design Reports for ASME Section III Components and Piping.</u>	
<u>Document Number</u>	<u>Document Title</u>
<u>APP-GW-GLR-013,</u> <u>Reference 32</u>	<u>Safety Class Piping Design Specifications and Design Reports Summary</u>
<u>APP-GW-GLR-048,</u> <u>Reference 23</u>	<u>Core Makeup Tank Design Specification and Design Report Summary</u>
<u>APP-GW-GLR-049,</u> <u>Reference 22</u>	<u>Accumulator Design Specification and Design Report Summary</u>
<u>APP-GW-GLR-050,</u> <u>Reference 27</u>	<u>Reactor Internals Design Specification and Design Reports Summary</u>
<u>APP-GW-GLR-051,</u> <u>Reference 26</u>	<u>Pressurizer Design Specification and Design Report Summary</u>
<u>APP-GW-GLR-052,</u> <u>Reference 28</u>	<u>Reactor Coolant Pump Design Specification and Design Report Summary</u>
<u>APP-GW-GLR-053,</u> <u>Reference 29</u>	<u>Passive RHR Heat Exchanger Design Specification and Reports Summary</u>
<u>APP-GW-GLR-054,</u> <u>Reference 25</u>	<u>In-Core Instrumentation Guide Tube Design Requirements and Design Report Summary</u>
<u>APP-GW-GLR-055,</u> <u>Reference 30</u>	<u>Reactor Vessel Design Specification and Design Report Summary</u>
<u>APP-GW-GLR-056,</u> <u>Reference 31</u>	<u>Steam Generator Design Specification and Design Report Summary</u>
<u>APP-GW-GLR-057,</u> <u>Reference 24</u>	<u>Control Rod Drive Mechanism Design Specification and Design Reports Summary</u>

PRA Revision:

None

Technical Report (TR) Revision:

None