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Your ref: Project Number 740
Our ref: DCP/NRC1827

February 8, 2007

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

In support of Combined License application pre-application activities, Westinghouse is submitting responses to the NRC requests for additional information (RAI) on AP1000 Standard Combined License Technical Report 6, APP-GW-GLR-021, Rev. 0, AP1000 As-Built COL Information Items. These RAI responses are 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 response is provided for request TR6-4, transmitted in NRC letter dated January 9, 2007 from Steven D. Bloom to Andrea Sterdis, Subject: Westinghouse AP1000 Combined License (COL) Pre-application Technical Report 6 – Request for Additional Information (TAC No. MD2174).

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

It is expected that when the RAI on Technical Report 6 is complete, the technical report will be revised as indicated in the response and submitted to the NRC. The RAI response will be included in the document.

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 cursive script that reads "D. F. Harkins". To the right of the signature, the word "for" is written in a smaller, cursive script.

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

/Attachment

1. "Oath of Affirmation," dated February 8, 2007

/Enclosure

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

cc:	S. Bloom	- U.S. NRC	1E	1A
	S. Coffin	- 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)

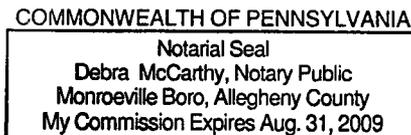
APPLICATION FOR REVIEW OF
"AP1000 GENERAL COMBINED LICENSE INFORMATION"
FOR COL APPLICATION PRE-APPLICATION REVIEW

W. E. Cummins, being duly sworn, states that he is Vice President, Regulatory Affairs & Standardization, 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.



W. E. Cummins
Vice President
Regulatory Affairs & Standardization

Subscribed and sworn to
before me this *8th* day
of February 2007.



Member, Pennsylvania Association of Notaries



Notary Public

ENCLOSURE 1

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

RAI-TR06-004

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Response to Request For Additional Information (RAI)

RAI Response Number: RAI-TR06-004

Revision:

Question:

TR6 - 4 COL Information Items 5.3-1 and 5.3-4

The staff is in the process of reviewing the information that was provided by Westinghouse Electric Company in report APP-GW-GLR-021 under Combined License (COL) Information Items 5.3-1 and 5.3-4. The staff has identified that additional information is needed to complete the evaluation. The staff's request for additional information (RAI) follows:

1. COL Information Item 5.3-1 (NRC FSER Combined License Action Item 5.2.2.2-1) states that the original AP1000 Design Control Document (DCD) includes generic pressure-temperature (P-T) limit curves based on the previously established design and limiting material requirements. Accordingly, the submittal proposes a markup to DCD Section 5.3.3 stating that the use of plant-specific P-T limit curves will be addressed by the COL holder during procurement and fabrication of the reactor vessel. The proposed DCD markup then further states that the development of plant-specific P-T limit curves and evaluation of LTOP setpoint pressure is required of the AP1000 COL holder prior to fuel load. The submittal proposes, in COL Information Item 5.3-4 (NRC FSER Combined License Action Item 5.3.4.3-1), that the COL holder will verify, prior to fuel load, that the actual plant-specific reactor vessel (RV) material properties for the Pressurized Thermal Shock (PTS) evaluation are consistent with what was established in the AP1000 DCD, based on the as-procured RV material data. The submittal also proposed mark-ups to DCD Section 5.3.4 that would implement this proposed COL holder action item. The applicant submitted AP1000 Standard COL Technical Report Number 33 on September 29, 2006. This report proposed changes to the %Cu content limit for the RV materials, as well as the P-T limit curves that were established in the original DCD. However, report APP-GW-GLR-021, as written, still references the P-T limit curves and material properties (including %Cu content) from the original DCD.
 - a) Please clarify whether the information in report APP-GW-GLR-021 should, in fact, reference the proposed P-T limit curves and new %Cu content limit from COL Technical Report Number 33.
 - b) If the information in report APP-GW-GLR-021 should reference the proposed P-T limit curves and new %Cu content limit from COL Technical Report Number 33, please revise report APP-GW-GLR-021 to include the new P-T limit curves proposed in COL Technical Report Number 33.
 - c) Please supplement report APP-GW-GLR-021 to include the following material properties and parameters used to calculate the P-T limit curves:

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Response to Request For Additional Information (RAI)

- %Cu content limit for RV forging and weld
 - %Ni content limit for RV forging and weld
 - minimum initial RTNDT values for the RV forging and weld
 - operating term in effective full power years (EFPY) of facility operation for which the P-T limit curves are valid
 - maximum projected peak forging and weld surface fluence for the above operating term
 - margin terms for the RTNDT calculations, as prescribed by Regulatory Guide (RG) 1.99, Revision (Rev.) 2
2. Please supplement report APP-GW-GLR-021 such that it addresses the following criteria pertaining to the implementation of the Technical Specification (TS) P-T limit curves by the COL holder:
- a) The final TS P-T limits and associated material properties will be verified by the NRC through an Inspection Test Analysis and Acceptance Criterion (ITAAC) prior to fuel load.
 - b) If new P-T limit curves and/or associated TS criteria for the P-T limit curves (e.g, effective full power years for which P-T limit curves are valid, LTOP system setpoint criteria, etc.) are proposed for facility operation at any point subsequent to issuance of the COL, the revised P-T limit curves and/or associated TS criteria will need to be authorized by the NRC via the license amendment process, as required by 10 CFR 50.90.

Westinghouse Response:

1. a) In the AP1000 Document APP-GW-GLN-009 (Reference 1) (Technical Report #33) a change to the limits for copper and a change of the generic pressure temperature limit curves (DCD Figures 5.3-2 and 5.3-3) are proposed. These figures will be incorporated into an amendment to the design certification or as generic departures to the design control document in the FSARs for COL applications.

The changes identified in APP-GW-GLN-009 do not alter the COL information items 5.3-1 or 5.3-4. The changes identified in APP-GW-GLN-009 have no impact on the need to correct the timing of the preparation of plant-specific curves and verification of plant-specific beltline material. The DCD figure numbers in COL Information Item 5.3-1 and the DCD table numbers in COL Information Item 5.3-4 are not altered by the changes identified in APP-GW-GLN-009

Although the changes in APP-GW-GLN-009 do not impact these COL information items, paragraphs will be added to the Background subsection of the technical report for COL Information Items 5.3-1 and 5.3-4 referencing the changes in APP-GW-GLN-009

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Response to Request For Additional Information (RAI)

1. b) As noted above, the changes identified in APP-GW-GLN-009 do not alter the COL Information Items 5.3-1 or 5.3-4 and have no impact on the need to correct the timing of the preparation of plant-specific curves and verification of plant-specific beltline material. Since the changes to the beltline material requirements or pressure-temperature limit curves do not impact the schedule for preparation of reports for material data and pressure-temperature limit curves based on actual material values, the changes do not need to be discussed in the APP-GW-GLR-021 report. The figure numbers and table numbers are not changed in the COL information items and the respective figures and tables are expected to be updated at the time of COL application by a design certification amendment or identification of FSAR departures from the DCD.
1. c) The detailed information needed to calculate pressure-temperature limit curves is discussed and the limits on these values provided in APP-GW-GLN-009. These values have no effect on the need to correct the timing in COL Information Items 5.3-1 and 5.3-4. The changes in APP-GW-GLR-021 do not impact the changes in materials requirements in APP-GW-GLN-009. Additionally it is not efficient to repeat this detailed information because of the added effort to maintain consistency when editing or revising the documents. Reference to the APP-GW-GLN-009 report will be added to the Technical Justification for both COL information items but the revised material equipments and pressure-temperature limit curves will not be included in APP-GW-GLR-021.
2. a) The ITAACs for the Reactor System (Tier 1, Subsection 2.1.3) includes a requirement in Item 11 for verification of the Charpy upper-shelf energy of the reactor pressure vessel beltline material. There are no other ITAACs related to pressure-temperature limits or associated material properties. The changes to the COL information items identified in APP-GW-GLN-009 do not alter the criteria for determining the requirement for an ITAAC and do not alter the evaluation of the activities included in the COL information items against those criteria. The NRC has other established opportunities for review or inspection of the as-built/as-procured pressure-temperature curve and material properties. Changes to ITAACs or addition to ITAACs are not proposed as part of the changes to COL Information Items 5.3-1 and 5.3-4.
2. b) The requirement for a Reactor Coolant System (RCS) Pressure And Temperature Limits Report (PTLR) is included in the administrative controls of the Technical Specifications in Subsection 5.6.6. RCS pressure and temperature limits for heatup, cooldown, low temperature operation, criticality, and hydrostatic testing as well as heatup and cooldown rates are established and documented in the PTLR for the technical specifications in 3.4.3, (RCS Pressure and Temperature (P/T) Limits) and 3.4.15, (Low Temperature Overpressure Protection (LTOP) System). The NRC requirements for review and approval of changes to pressure-temperature limit curves and LTOP setpoints are not altered by the changes proposed in APP-GW-GLR-021. Repeating NRC regulations and criteria for these changes in the report would be redundant and is not required.

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Response to Request For Additional Information (RAI)

Reference:

1. APP-GW-GLN-009, Pressure Boundary Material, Revision 1

Design Control Document (DCD) Revision:

None in addition to the changes previously provided in the technical report.

PRA Revision:

None

Technical Report (TR) Revision:

Add the following paragraph to the Background for COL information Item 5.3-1.

Changes to the pressure-temperature curves shown in Figures 5.3-2 and 5.3-3 of the design control document are proposed in a separate AP1000 Standard Combined License Technical Report, APP-GW-GLN-009 (Reference 4). These changes do not impact the proposed change to COL Information Item 5.3-1 to address timing issues.

Revise the third paragraph of the Technical Justification for COL Information Item 5.3-1 as follows

The pressure-temperature curves are developed considering a radiation embrittlement of up to 54 effective full power years (EFPY) consistent with the plant design objective of 60 years with 90 percent availability. Changes to the pressure-temperature curves shown in Figures 5.3-2 and 5.3-3 of the design control document are proposed in a separate AP1000 Standard Combined License Technical Report, APP-GW-GLN-009 (Reference 4). The copper and nickel content amount and initial RT_{NDT} for materials in the reactor vessel beltline region and the reactor vessel flange and the closure head flange region are included in the evaluation to establish these curves. These values are not known until the reactor vessel is fabricated.

Add the following paragraph to the Background for COL information Item 5.3-4.

Changes to beltline material properties included in Table 5.3-1 and 5.3-3 of the design control document are proposed in a separate AP1000 Standard Combined License Technical Report, APP-GW-GLN-009 (Reference 4). These changes do not impact the proposed change to COL Information Item 5.3-4 to address timing issues.

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Response to Request For Additional Information (RAI)

Revise the second paragraph of the Technical Justification for COL Information Item 5.3-4 as follows

Beltline material properties degrade with radiation exposure, and this degradation is measured in terms of the adjusted reference nil ductility temperature, which includes a reference nil ductility temperature shift (ΔRT_{NDT}), initial RT_{NDT} and margin. The extent of the RT_{NDT} shift is enhanced by certain chemical elements (such as copper and nickel). Ferritic reactor vessel materials must comply with the fracture toughness requirements of Section 50.55a and Appendices G and H of 10 CFR 50. The ferritic materials of the reactor vessel beltline are restricted to the maximum limits. Copper, nickel, and phosphorus content is restricted to reduce sensitivity to irradiation embrittlement in service. Changes to beltline material properties included in Table 5.3-1 and 5.3-3 of the design control document are proposed in a separate AP1000 Standard Combined License Technical Report, APP-GW-GLN-009 (Reference 4).

Add the following Reference

4. APP-GW-GLN-009, Pressure Boundary Material, Revision 1