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Your ref: Docket No. 52-006
Our ref: DCP/NRC2134

May 14, 2008

Subject: AP1000 COL Response to Requests for Additional Information (TR 106)

Westinghouse is submitting a response to the NRC requests for additional information (RAI) on AP1000 Standard Combined License Technical Report (TR) 106, APP-GW-GLN-106, "Mechanical System and Component Design Updates". This RAI response is submitted in support of the AP1000 Design Certification Amendment Application (Docket No. 52-006). 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.

A response is provided for RAI-TR106-CIB1-05, as sent in an email from Bill Gleaves to Sam Adams dated April 4, 2008. This response completes all requests received to date for Technical Report 106. A response for RAI-TR106-CIB1-04 was submitted under letter DCP/NRC2081 dated January 29, 2008. Responses to RAI-TR106-CIB1-01 through -03 were submitted under Westinghouse letter DCP/NRC2019 dated October 5, 2007. Responses for RAI-TR106-SEB1-01 through -04 were submitted under Westinghouse letter DCP/NRC2000 on September 19, 2007.

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'.

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

/Enclosure

1. Response to Requests for Additional Information on Technical Report 106

cc:	B. Gleaves	- U.S. NRC	1E
	E. McKenna	- U.S. NRC	1E
	P. Ray	- TVA	1E
	P. Hastings	- Duke Power	1E
	R. Kitchen	- Progress Energy	1E
	A. Monroe	- SCANA	1E
	J. Wilkinson	- Florida Power & Light	1E
	C. Pierce	- Southern Company	1E
	E. Schmiech	- Westinghouse	1E
	G. Zinke	- NuStart/Entergy	1E
	R. Grumbir	- NuStart	1E
	N. Prasad	- Westinghouse	1E

ENCLOSURE 1

Response to Requests for Additional Information on Technical Report 106

AP1000 TECHNICAL REPORT REVIEW

Response to Request For Additional Information (RAI)

RAI Response Number: RAI-TR106-CIB1-05

Revision: 0

Question:

This is a Supplemental RAI to NRC RAI-TR106-CIB1-04.

1. The staff requests the following additional information:

- a. Provide the corrosion testing plan and acceptance criteria for Duplex 2101 and Duplex 2101 welds.
- b. Provide the technical justification for the testing plan and acceptance criteria that describes its adequacy to ensure that the materials will not be subject to general corrosion, stress corrosion cracking or other forms of materials degradation due to corrosion for the life of the plant.
- c. Provide the corrosion testing data for Duplex 2101 base material and Duplex 2101 welds.
- d. If the information requested in c. above is not currently available, provide a date by which all corrosion testing will be complete and the applicant will submit the results of its corrosion testing to the NRC.

The applicant's January 29, 2008, response did not discuss its corrosion testing plan or the acceptance criteria that will be used. The applicants proposed use of Duplex 2101 cannot be fully evaluated by the staff until corrosion testing of Duplex 2101 base material and welds has been completed. In APP-GW-GLN-106, Revision 1 (TR106) dated September 28, 2007, the applicant indicated that LDX 2101 (Duplex stainless steel) may be used to fabricate the walls of the in-containment refueling water storage tank (IRWST). By letter dated January 29, 2008, Westinghouse Electric Company provided its response to NRC RAI-TR106-CIB1-04. The aforementioned RAI requested, in part, that the applicant provide a description of the corrosion testing plan that will be used to test Duplex 2101 and discuss why the testing plan is adequate to ensure that the materials will not be subject to general corrosion, stress corrosion cracking or other forms of materials degradation due to corrosion for the life of the plant. The applicant did not address this portion of the RAI.

2. In order to provide clarification regarding the material specification/grade in the applicant's proposed revision to DCD Tier 2, Section 6.1.1.3 (see Westinghouse letter dated October 5, 2007), the staff suggests that Westinghouse modify Section 6.1.1.3 to include the material grade. For example, "The walls of the in-containment refueling water storage are fabricated from ASTM/ASME A240/SA-240, UNS S32101." This modification is needed to provide clarification as to the grade of material that the applicant intends to use.

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Westinghouse Response:

Response to Item 1:

Available data on the S32101 Duplex Stainless steel and its welds (Reference 1), from testing in a variety of acid and chloride environments, suggest that when compared with 304 and 316 L grade austenitic materials, S32101 grade Duplex steel provides a superior corrosion resistance in combination with substantially higher yield strength. Nevertheless, Westinghouse is conducting a "confirmatory" corrosion test program to further demonstrate the adequacy of S32101 Duplex Stainless Steel and its welds as the structural module materials in AP1000. It will confirm that the module structures in AP1000 will not be subject to general corrosion, stress corrosion cracking or other forms of material degradation due to corrosion for the life of the plant. The Westinghouse program is designed to establish test data on S32101 material and its welds on their susceptibility for any potential for degradation under exposure to oxygenated boric acid with halogen (chloride) contamination and in crevice corrosion conditions under accelerated service conditions to demonstrate the service life.

The Test Program:

- The test program includes S32101 base material, two weld filler (2101 and 2209) materials bounding three filler compositions and will employ weld processes to bound weld fabrication procedures. Type 304 austenitic stainless steel will be used for reference sample in all tests.
- Several different types of corrosion tests will be conducted namely, Immersion (or uniform corrosion), Stress Corrosion cracking, Crevice Corrosion Tests, etc.
- The testing will be conducted at 200°F and will incorporate aerated Boric acid solution at different boron concentrations, and contaminations levels employing test samples with pickled and activated surface conditions.
- ASTM and NACE test standards will be employed for test procedures where applicable.

Documentation and Acceptance Criteria

- Test data will be included in the 'Final Test Report' which will be made available to the NRC staff for audit.

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Response to Request For Additional Information (RAI)

- The test data will be developed for bounding conditions on a conservative basis and will be applicable to operating conditions for a 60 year service life of the plant.
- Acceptance criteria to assure nil or negligible general (uniform) corrosion, adequate resistance to crevice corrosion and stress corrosion cracking under service conditions will be adapted. The criteria will assure the S32101 Duplex stainless steel material performance that is equivalent or better than that of commonly used austenitic stainless steels to demonstrate 60 year service life.
- Westinghouse estimates that the testing will be completed within a period of approximately six months time. It may be noted that, as stated earlier, Westinghouse program is just a "confirmatory" corrosion test program to further demonstrate the adequacy of S32101 Duplex Stainless Steel and its welds. The results reported in the literature from extensive corrosion testing in a variety of acid and chloride environments (Reference 1), have suggested that when compared with 304 and 316L grade austenitic materials, S32101 grade Duplex steel provides a superior corrosion resistance. This is supported by good service experience with the material in petrochemical and paper and pulp industries. Therefore, Duplex S32101 material is also expected to perform well under boric acid with crevice contamination conditions.

Reference:

1. "Outokumpu Stainless Corrosion Handbook" Ninth edition, Outokumpu Stainless AB, Avesta Research Center, PO Box 74, SE-77422 Avesta, Sweden.

Response to Item 2:

DCD Tier 2, Section 6.1.1.3 will be modified to include the material grade, as shown below.

Design Control Document (DCD) Revision:

Revise DCD Rev.16 Tier 2, Section 6.1.1.3 as follows:

The walls of the in-containment refueling water storage tank ~~may be~~ are fabricated of ASTM/ASME A240/SA-240 ~~Designation 532101, UNS S32101.~~

PRA Revision:

None

Technical Report (TR) Revision:

None