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Your ref: Docket No. 52-006
Our ref: DCP_NRC_002607

August 31, 2009

Subject: AP1000 Response to Request for Additional Information (SRP 3)

Westinghouse is submitting a response to the NRC request for additional information (RAI) on SRP Section 3. This RAI 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 RAI(s):

RAI-SRP3.8.3-SEB1-06 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,

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

/Enclosure

1. Response to Request for Additional Information on SRP Section 3

D063
NRO

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ENCLOSURE 1

Response to Request for Additional Information on SRP Section 3

AP1000 TECHNICAL REPORT REVIEW

Response to Request For Additional Information (RAI)

RAI Response Number: RAI-SRP3.8.3-SEB1-06
Revision: 2

Question:

DCD Section 3.8.3.6 was revised regarding the use of different steel materials for CIS structural modules. Westinghouse is requested to address the items listed below.

1. The required use of A36 steel plates and shapes for the modules was revised in DCD Rev. 16 to allow the use of carbon steel plates and shapes. Since it is unknown what types of steel material could be used and the analysis and design of the modules assumed certain specific properties (e.g., to meet allowable stresses), Westinghouse is requested to explain why the material designation was revised, identify the specific materials that are considered to be options, and demonstrate that the alternative materials are equivalent to or better than the properties used in the analysis and design of the modules. The specific materials should be included in the DCD.

2. The use of Nitronic 33, ASTM 240, designation S24000, Type XM-29, stainless steel plates for the modules was revised in DCD Rev. 16 to use Duplex 2101 ASTM 240, Designation S32101, stainless steel plates. Westinghouse is requested to explain why this material was revised, how the material properties compare, and demonstrate that the new material properties specified are equivalent to or better than the properties used in the analysis and design of these structures.

If your response to this request for additional information will reference Revision 17 to the AP1000 DCD, please provide an exact reference.

Revision 1

During discussions with the NRC the staff requested that reference to the A36 specifications be returned to the DCD.

Revision 2

The staff reviewed the Westinghouse response to RAI 3.8.3-SEB1-06 Rev. 1, transmitted in their letter dated July 2, 2009. Westinghouse responded to the two items identified in the RAI related to materials used for the structural modules. However, two items still need to be addressed as follows:

For the first item, Westinghouse plans to identify the use of A36 or A992 as acceptable carbon steel materials for use in the structural modules in DCD Sections 3.8.3 and 3.8.4. Westinghouse indicates that these two materials are considered to have equivalent specifications commonly used for rolled shapes. The staff notes that A36 and A992 have substantially different yield strengths. Also, it is not clear which material was utilized in the various designs for qualifying the modules. Therefore, Westinghouse is requested to address the same question raised in the previous RAI which asked that Westinghouse "demonstrate that the alternative materials are equivalent to or better than the properties used in the analysis and design of the modules."

For the second item, Westinghouse explained why Nitronic 33, ASTM 240, Designation S24000, Type XM-29 stainless steel plates for the modules was revised to use Duplex 2100, ASTM 240, Designation S32101. However, as in the first item of the RAI, these two materials have different yield strengths.

Therefore, Westinghouse is requested to address the same question raised in the previous RAI which asked that Westinghouse "demonstrate that the alternative materials are equivalent to or better than the properties used in the analysis and design of the modules."

Westinghouse Response: (Revision 0, 1)

1. The revisions were made to remove only the text A36 specifically. A36 is a carbon steel and will be used if available. If A36 is not available, an equivalent carbon steel may be substituted. ASTM A992 is considered an equivalent specification commonly used for rolled shapes will be added to the DCD. DCD Subsection 3.8.3.6 will be revised to include reference to A36 and A992. In DCD Revision 17, Table 3.8.4-6 lists the materials that are used in Structural and Miscellaneous steel. ASTM A992 will be added to Table 3.8.4-6

2. In Westinghouse Technical Report No. 57 Rev 2, Section 2.1.2, the change from Nitronic 33 steel to Duplex 2101 is described:

   "Duplex 2101 will be used on modules in contact with water in the refueling canal and IRWST. Nitronic 33 was originally intended to meet this application; however, this material is not available in the required plate sizes (1/2" thick x 120" wide). Duplex 2101 is a lean duplex stainless steel designed for general-purpose use. Due to the unique composition of the Duplex 2101, this material provides high strength, excellent resistance to stress corrosion cracking, and economical alternative to 304 or 316L stainless steels. The Duplex 2101 has a yield strength of 65ksi."

Response Revision 2

The portions of modules constructed using carbon steel use properties for ASTM A36 in the analysis and design of the modules. The properties for the alternative material (ASTM A992) are equivalent to or better than the properties used in the analysis and design of the modules. The elastic modulus for the two materials is the same and therefore, the response of the steel concrete composite structure is the same for the two materials. ASTM A992 has higher yield and ultimate strength than the ASTM A36 material

Duplex 2101 (ASTM 240, Designation S32101) has replaced Nitronic 33 as the specified material for stainless steel plates used on the surfaces of modules in contact with water during normal operation or refueling. Nitronic 33 is not expected to be used. The analysis and design of the modules used appropriate properties for the Duplex 2101 material.

Design Control Document (DCD) Revision: (Revision 1)

Revise Subsection 3.8.3.6 as follows: (DCD Revision included with RAI Response Revision 1; no DCD revision is required for additional material provide in RAI Response Revision 2)

3.8.3.6 Materials, Quality Control, and Special Construction Techniques

Subsection 3.8.4.6 describes the materials and quality control program used in the construction of the containment internal structures. The structural steel modules are constructed using carbon steel plates and shapes (ASTM A36, ASTM A992, or equivalent).

Duplex 2101 (American Society for Testing and Materials A240, designation S32101) stainless steel plates are used on the surfaces of the modules in contact with water during normal operation or refueling. The structural wall and floor modules are fabricated and erected in accordance with AISC-N690. Loads during fabrication and erection due to handling and shipping are considered as normal loads as described in subsection 3.8.4.3.1.1. Packaging, shipping, receiving, storage and handling of structural modules are in accordance with NQA-1, Subpart 2.2 (formerly ANSI/ASME N45.2.2 as specified in AISC N690).

Revise Table 3.8.4-6 as follows: (DCD Revision included with RAI Response Revision 1)

Table 3.8.4-6

MATERIALS USED IN STRUCTURAL AND MISCELLANEOUS STEEL

Standard	Construction Material
ASTM A1	Carbon steel rails
ASTM A36/A36M	Rolled shapes, plates, and bars
ASTM A108	Weld studs
ASTM A123	Zinc coatings (hot galvanized)
ASTM A240	Duplex 2101 stainless steel (designation S32101)
ASTM A307	Low carbon steel bolts
ASTM A325	High strength bolts
ASTM A354	Quenched and tempered alloy steel bolts (Grade BC)
ASTM A588	High-strength low alloy structural steel
ASTM A992/A992M	Structural steel shapes
ASTM-F1554	Steel anchor bolts, 36, 55, and 105-ksi Yield Strength

PRA Revision: None

Technical Report (TR) Revision: None