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Your ref: Docket No. 52-006  
Our ref: DCP\_NRC\_002550

July 2, 2009

Subject: AP1000 Response to Request for Additional Information (SRP 5)

Westinghouse is submitting a response to the NRC request for additional information (RAI) on SRP Section 5. 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-SRP5.2.1-EMB-04 R1

This RAI response is a request for approval to use ASME Code Cases N-757-1 and N-759-2. Westinghouse confirms that these code cases are not currently approved by the NRC in Regulatory Guide 1.84. The justification required by 10 CFR 50.55a (a)(3) for the use of these code cases in the AP1000 design is provided in the body of the RAI response. Westinghouse has determined that using the most recent revisions of the Code Cases will have no adverse impact on the design and licensing basis of the AP1000.

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 Request for Additional Information on SRP Section 5

DD63  
NRW

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ENCLOSURE 1

Response to Request for Additional Information on SRP Section 5

# AP1000 TECHNICAL REPORT REVIEW

## Response to Request For Additional Information (RAI)

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RAI Response Number: RAI-SRP5.2.1-EMB-04  
Revision: 1

### **Question:**

Revision 17 of the AP1000 DCD indicated that three new Code Cases were added to Table 5.2-3 as Code Cases used in AP1000 design. These code cases are N-655, "Use of SA-738, Grade B, for Metal Containment Vessels, Class MC, Section 11, Division 1", N-757, "Alternative Rules for Acceptability for Class 2 and 3 Valves, NPS 1 (DN25) and Smaller with Welded and Non-welded End Connections other than Flanges, Section III, Division 1", and N-759-1, "Alternative Rules for Determining Allowable External Pressure and Compressive Stresses for Cylinders, Cones, Spheres, and Formed Heads, Section III, Division 1". The staff requests that Westinghouse confirm whether these code cases are approved by the NRC in Regulatory Guide 1.84. If not, provide justification and reconciliation for using these code cases in the AP1000 design in accordance with the requirements of ASME Section III, NCA-1140.

It appears that the most recent versions of these code cases are identified as N-655-1, N-757-1 and N-759-2. A resolution would be for Westinghouse to apply the most recent code cases in Table 5.2-3 in compliance with 10CFR50.55a (b)(4).

In a phone call with the NRC staff on June 19, 2009 the staff requested additional information on the use of Code Case N-757-1. The information requested was about how the information and concern in NRC Information Notice 92-15 and Information Notice 84-55 are addressed.

### **Westinghouse Response:**

Revision 1 addresses the comments from the NRC in a phone call on June 19, 2009 about Code Case N-757-1. Comments from the NRC in a phone call on June 26, 2009 about Code Case N-759-2 are also addressed.

These ASME Section III Code Cases are not included in the most recent publication of Regulatory Guide 1.84. The justification required by 10CFR50.55a (a)(3) for the use of the subject code cases is provided below. This RAI response should be considered a request for the use of these code cases. As suggested in the request above, Westinghouse is applying the most recent versions of the subject Code Cases. Westinghouse has determined that using the most recent revisions of the Code Cases will have no adverse impact on the design and licensing basis of the AP1000.

ASME Code Case N-655 was originally written to permit the use of SA-738 material. The version of the ASME Code used for the construction of the containment, 2001 Edition, 2002 Addenda, includes the use of SA-738 so a Code case is not needed for this material. Code Case N-655-1 replaced Supplementary Requirement S-17 by Supplementary Requirement S-1. Supplementary Requirement S-1 is considered to be equivalent to Supplementary Requirement

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S-17 for controlling the quality of the SA-738 material. Table 5.2-3 will be changed from N-655 to N-655-1 as shown in the DCD markup below.

The change from S17 to S1 was communicated to the NRC in APP-GW-GLN-113, (TR-113) "AP1000 Containment Vessel Shell: Material Specification" (ML071340345) which was submitted in May 2007. Westinghouse has not received any feedback on this document. As noted in APP-GW-GLN-113, SA- 738 Grade B material with imposed Supplementary Requirement S-17 is generally not available. It has been determined that the steel producing mills do not use S17 process ("Vacuum Carbon-Deoxidized Steel"); but use supplementary requirement S1 to get similar high quality steel. Supplementary Requirement S1 requires the steel to be made by a process which includes vacuum degassing while molten by a suitable practice selected by the steel manufacturer or purchaser.

In letter DCP/NRC2402 Westinghouse requested NRC approval of the use of Code Cases N-757 and N-759-1. This letter included justification of the use of two Code Cases added in DCD Revision 17 as shown below.

Code Case N-757-1 specifies the use of the alternate rules for the acceptability of Class 2 and 3 valves, NPS 1 (DN25) and smaller with welded and nonwelded end connections other than flanges in the design of small valves. The ASME Code requirements for the design of valves are contained in Articles NC-3500 and ND-3500 for ASME Code Class 2 and 3 valves. The standard design rules in Paragraphs NC-3512 and ND-3512 require that the minimum wall thickness satisfies the thickness requirements specified in the valve standard ASME B16.34, Valves - Flanged, Threaded, and Welding End. Paragraphs NC-3513 and ND-3513 provide alternate design rules that may be used in place of NC-3512 and NC-3512 when permitted by the Design Specification. However, these alternate rules only apply to valves with butt welding end connections and socket welding end connections. Code Case N-757-1 specifies the use of the alternate design rules for welded and non-welded end connections other than flanges, in the design of small valves. The Code Case N-757-1 provides additional requirements that the valves must meet in order that they meet the design requirements of Section III, Division 1, Class 2 and 3 rules of Paragraphs NC-3512 and ND-3512. These include wall thickness requirements, end connection requirements, such as compression fittings, loadings requirements, and design requirements.

The entry for Code Case N-757-1 in DCD Table 5.2-3 includes a footnote that the design provisions of ASME Code, Section III, Division I, Appendix XIII not be used for the design of Code Class 3 (ND) valves. This requirement is consistent with the restrictions included by the NRC on the approval of the use of Code Case N-757 for another nuclear power plant.

NRC Information Notices 92-15 and 84-55 discuss issues identified with the operating experience of non-welded valves. These issues are addressed by provisions in design documents, including design specifications and instruction manuals, to provide information and cautions that include: a) not mixing the parts from one manufacturer to another, b) following

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manufacturer's recommended instructions for installing compression fittings, and c) provide for training and procedures for personnel doing the work.

Code Case N-759-2 is used in the design of the AP1000 to address an issue with the primary side depressurization transients. The revised transient requires a different set of criteria for steam generator tube collapse analysis. Code Case N-759-2, provides an alternative methodology for tube collapse analysis based on theoretical buckling equations and buckling tests on fabricated cylindrical tubes.

Use of theoretical buckling equations and buckling tests to develop the code case provides assurance that use of Code Case N-759 would provide an acceptable level of quality and safety. Compliance with the existing rules of the ASME Code without the use of Code Case N-759-2 would require a redesign of the AP1000 steam generator tube bundle. This would represent a hardship without a compensating increase in the level of quality and safety. This discussion provides the justification required by 10CFR50.55a (a)(3) for the use of Code Case N-759-2.

### Design Control Document (DCD) Revision:

Revise the entries for Code Cases N-655, N-757, and N-759 in Table 5.2-3 as shown below.

Table 5.2-3	
ASME CODE CASES	
Code Case Number	Title
N-655-1	Use of SA-738, Grade B, for Metal Containment Vessels, Class MC, Section III, Division 1
N-757-1	Alternative Rules for Acceptability for Class 2 and 3 Valves, NPS 1 (DN25) and Smaller with Welded and Nonwelded End Connections other than Flanges, Section III, Division 1 <sup>(d)</sup>
N-759-2	Alternative Rules for Determining Allowable External Pressure and Compressive Stresses for Cylinders, Cones, Spheres, and Formed Heads, Section III, Division 1

### PRA Revision:

None

### Technical Report (TR) Revision:

None