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Your ref: Docket No. 52-006
Our ref: DCP_NRC_002695

October 21, 2009

Subject: AP1000 Response to Proposed Open Item (Chapter 3)

Westinghouse is submitting the following responses to the NRC open item (OI) on Chapter 3. These proposed open item response are submitted in support of the AP1000 Design Certification Amendment Application (Docket No. 52-006). The information included in these responses 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 proposed Open Item(s):

OI-SRP3.4.1-RHEB-01
OI-SRP3.4.1-RHEB-02

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,

John J. DeBlasio

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

/Enclosure

1. Response to Proposed Open Item (Chapter 3)

DO63
NRO

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ENCLOSURE 1

AP1000 Response to Proposed Open Item (Chapter 3)

AP1000 DESIGN CERTIFICATION REVIEW

Response to SER Open Item (RAI)

RAI Response Number: OI-SRP3.4.1-RHEB-01
Revision: 0

Question:

The design of the annex, radwaste, and diesel/generator roofs now incorporate parapets with weir openings to drain water off of the roof. The applicant, however has not provided an analysis to show that these openings are sufficient to prevent ponding of water on the roof given the increase in the Probable Maximum Precipitation value from 19.4 in/hr to 20.7 in./hr and the additional design features.

Additional question from E-Mail of October 13, 2009:

Specify and identify the normal and extreme liquid and frozen precipitation events used in the design of the roofs of the affected safety related structures in accordance with the Interim Staff Guidance DC/COL-ISG-07, "Interim Staff Guidance on Assessment of Normal and Extreme Winter Precipitation Loads on the Roofs of Seismic Category I Structures" (ML091490565). These events should be identified as site parameters (e.g., normal winter precipitation event expressed as a ground-level weight in lbf/ft2, extreme frozen winter precipitation event expressed as a ground-level weight in lbf/ft2, and extreme liquid winter precipitation event expressed in inches of water) in DCD Tier 1, Table 5.0-1 and Tier 2, Table 2-1. Provide a basis for the chosen site parameter values, including ensuring the postulated site parameter values are representative of a reasonable number of sites that have been or may be considered for a COL application.

Westinghouse Response:

Response to Original Question

The annex, radwaste, and diesel/generator buildings are not Seismic Category I structures. There will be no ponding due to the increase in rain fall from 19.4 in/hr to 20.7 in/hr because the parapet walls are designed so that they do not impede the normal runoff of water (defined from a 20.7 in/hr rain storm) from the roof of the buildings. There are no weir openings in the design and the DCD is changed to reflect this. Adequate openings are provided along the bottom of the parapet walls to permit water to drain normally from the roof of the buildings to scuppers/drains to preclude accumulation of water on the roofs.

Response to Additional Question

It is noted that liquid and frozen precipitation events related to the AP1000 design has been provided to the NRC in response to NRC RAI 1854 for Vogtle 3 & 4.

The required design basis for the normal and extreme winter precipitation loads on the roofs of Seismic Category I Structures is the same as the design basis for all AP1000 roofs, which was certified by the NRC under Design Certification Document (DCD), APP-GW-GL-700, Revision 15 and has not changed in future revisions except for the maximum rainfall that was increased from 19.4 in/hr to 20.7 in/hr to envelop siting an AP1000 in Florida.

The AP1000 roof design considers a ground snow/ice load equal to 75 psf, and the roof snow loads calculated in accordance with ASCE 7-98. The AP1000 design parameters follow the Utility Requirements Document (URD). The URD calls for a ground snow load of 50 psf. The AP1000 is designed for a higher load to account for the combined effect of snow with ice and/or rain build up.

Using ASCE 7-98, the 50 psf ground snow load converts to a 42 psf roof snow load for roof design. The AP1000 snow/ice design load of 75 psf ground snow load converts to a 63 psf roof snow load for roof design. The difference between the AP1000 and URD roof snow/ice design load is 21 psf (63-42). This additional load reflects the accumulation of ice and water on the roof. This additional loading of 21 psf converts to a depth of 4" of water build up using the density of water (62.4 pcf). Again, this depth of water and its load is in addition to the existing snow depth and load from previously accumulated snow on the roof. The density of snow is lower than that of water, which is conservatively 19 pcf due to the amount of voids present in packed snow. Therefore, it can be assumed that 26.5" of snow already is present on the roof when the rain falls and is impounded.

The chosen site parameter values have been defined from the URD to ensure that the postulated site parameter values are representative of a reasonable number of sites that have been or may be considered for a COL application. Further, as mentioned above, the rainfall precipitation has been increased to envelop a site that is subject to slightly higher rain fall in Florida.

Design Control Document (DCD) Revision (Post Revision 17):

Change the second sentence of second paragraph of DCD Subsection 3.4.1.1.1 removing the term weir:

Flooding does not occur from the probable maximum precipitation. The roofs do not have internal roof drains. The annex, radwaste, and diesel/generator buildings have parapets with large ~~weir~~ openings to drain to scuppers/drains to preclude accumulation of water on the roofs. The roofs are sloped such that rainfall is directed towards gutters located along the edges of the roofs. Therefore, ponding of water on the roofs is precluded. Water from roof drains and/or scuppers, as well as runoff from the plant site and adjacent areas, is conveyed to catch basins, underground pipes, or directly to open ditches by sloping the tributary surface area. The site is graded to offer protection to the seismic Category I structures.

PRA Revision: None

AP1000 DESIGN CERTIFICATION REVIEW

Response to SER Open Item (RAI)

RAI Response Number: OI-SRP3.4.1-RHEB-02
Revision: 0

Question:

The staff reviewed the proposed increase in storage volume in the larger firewater storage tank. The amendment seeks to increase the tank volume from 400,000 to 490,000 gallons. The applicant, however, has not provide an analysis of the external flooding caused by tank rupture of the new tank design on safety related structures, systems and components.

Westinghouse Response:

In DCD Subsection 3.4.1.1.1 it is stated that the "slope of the yard grade directs water away from the buildings." The firewater storage tank is on the North side of the turbine building approximately 320 feet away from the Nuclear Island. In the event of sudden release of the water from the 490,000 gallon firewater storage tank this will not affect the Nuclear Island structures because of it's distance from the tank, and the site grading that directs the water away from the safety related structures.

The following statement is added to the first bullet in DCD Subsection 3.4.1.1.1 related to site drainage: "Water will drain from the tanks away from the turbine and Nuclear Island buildings due to site grading."

Design Control Document (DCD) Revision: (Post Rev. 17 revision)

Modify the first bullet in Subsection 3.4.1.1.1 to the following:

- Fire water tanks as described in subsection 9.5.1. These two tanks have volumes of approximately 325,000 and 490,000 gallons, and are located at the north end of the turbine building. Water will drain from the tanks away from the turbine and Nuclear Island buildings due to site grading.

PRA Revision:

None