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Your ref: Docket No. 52-006
Our ref: DCP_NRC_002886

May 20, 2010

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 responses 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-SRP3.2.1-EMB2-06 R1

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 Proposed Open Item (Chapter 3)

cc: D. Jaffe - U.S. NRC 1E
E. McKenna - U.S. NRC 1E
P. Clark - U.S. NRC 1E
T. Spink - TVA 1E
P. Hastings - Duke Power 1E
R. Kitchen - Progress Energy 1E
A. Monroe - SCANA 1E
P. Jacobs - Florida Power & Light 1E
C. Pierce - Southern Company 1E
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ENCLOSURE 1

AP1000 Response to Proposed Open Item (Chapter 3)

AP1000 DESIGN CERTIFICATION REVIEW

Response to SER Open Item (OI)

RAI Response Number: OI-SRP3.2.1-EMB2-06
Revision: 1

Question:

In RAI-SRP3.2.1-EMB2-06, the applicant was requested to provide a list of SSCs necessary for continued operation or an alternative to address the requirements. If DCD Table 3.2-3 serves this purpose, the applicant was requested to clearly state in the DCD that the Table contains the list of SSCs necessary for continued operation.

Additional Question (Revision 1):

- a) This staff concern is primarily a pre-earthquake planning issue that is defined in RG 1.166 and discussed in SRP Section 3.7.4. The response identified that the DCD would be revised to include a statement regarding safety-related SSCs that are necessary for continued operation that must remain functional without undue risk of the health and safety of the public during and following an operating basis earthquake.
- b) The staff is concerned that addressing only safety-related SSCs is inconsistent with EPRI guidance on pre-earthquake planning for an OBE event and that all SSCs important to safety should be considered for evaluation/inspection. SSCs important to safety include nonsafety-related SSCs that must remain functional without undue risk of the health and safety of the public.
- c) Based on SRP 3.7.4, the DC and COL applicants should provide a description of the pre-earthquake planning and post-earthquake actions and the applicant's program should include selecting equipment and structures for inspections. The applicant should clarify if the list of SSCs needed for continued operation includes risk-significant nonsafety-related SSCs such as RTNSS SSCs or otherwise justify why nonsafety-related seismic Category II and RTNSS SSCs are not risk-significant.
- d) Further, the DCD states that RG 1.166 for Pre-Earthquake Planning is not applicable to the AP1000 design certification and combined license applicants referencing the AP1000 certified design will prepare site-specific procedures for activities following an earthquake. The applicant should clarify if the site-specific procedures will include the complete list of SSCs necessary for continued safe operation and clarify when the procedures are to be available for NRC inspection.

Westinghouse Response:

The response to RAI-SRP3.2.1-EMB2-06 transmitted with Westinghouse Letter DCP_NRC_002620, dated September 17, 2009 (ADAMS Accession Number ML092640644) is superseded by this response.

The structures, systems, and components (SSCs) necessary to protect the public health and safety are the safety related (AP1000 Equipment Class A, B, and C) SSCs identified in Section 3.2.2 of the AP1000 Design Control Document (DCD) and tabulated in DCD Table 3.2-3. These

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SSCs are those necessary to ensure: (1) the integrity of the reactor coolant pressure boundary; (2) the capability to shut down the reactor and maintain it in a safe shutdown condition; or (3) the capability to prevent or mitigate the consequences of accidents that could result in potential offsite exposures. Consistent with the guidance of Regulatory Guides 1.70 and 1.206 for Subsection 3.2.2 the classification of SSCs in Table 3.2-3 addresses fluid systems and mechanical systems. In addition to the systems and components identified in Table 3.2-3 the Protection and Safety Monitoring System (PMS) and Class 1E dc and UPS system (IDS) are Equipment Class C, safety-related systems that provide instrumentation and electrical power. The seismic classification of the structures that are part of the AP1000 standard design is tabulated in DCD Table 3.2-2.

As noted in DCD Subsection 3.2.2.2 Equipment Class A, B, and C SSCs are seismic Category I. As noted in DCD Subsection 3.2.1.1.1, seismic Category I SSCs are designed, analyzed, and qualified to survive the safe shutdown earthquake (SSE). The safety-related SSCs are available following an operating basis earthquake (OBE) to shutdown the plant and maintain it in a safe condition. As discussed in DCD Subsection 3.10.1.2 an equipment qualification data package (EQDP) is developed for the instrumentation and electrical equipment classified as seismic Category I. Table 3.11-1 of Section 3.11 identifies the seismic Category I electrical equipment and instrumentation supplied for the AP1000. In addition to the information in the DCD, specifications and other design and procurement documents identify the equipment classification and seismic categorization of AP1000 systems and components. This information is available to operators of AP1000 nuclear power plants.

As noted in DCD Section 3.7 the operating basis earthquake has been eliminated as a design requirement for the AP1000. Criteria for evaluating the need to shut down the plant following an earthquake are established using the cumulative absolute velocity approach according to EPRI Report NP-5930 and EPRI Report TR-100082. As noted in DCD Section 3.7, for the purposes of the shutdown criteria in NP-5930, the operating basis earthquake for shutdown is considered to be one-third of the safe shutdown earthquake. Note: because the operating basis earthquake is one-third of the safe shutdown earthquake the criteria of 10 CFR Part 50, Appendix S, IV(a)(2)(i)(A) applies and the criteria of Part 50, Appendix S, IV(a)(2)(i)(B) and IV(a)(2)(i)(B)(I) do not apply

In the event of a seismic ground motion meeting criteria in 10 CFR Part 50, Appendix S the plant may need to be shut down. Prior to resuming operations, the licensee must demonstrate to the Commission that no functional damage has occurred to those features necessary for continued operation. DCD Tables 3.2-3 and 3.11-1 tabulate the safety-related systems and components that must be considered in an inspection and evaluation performed to demonstrate that no functional damage has occurred. Information is added to DCD Subsection 3.2.1.1, as shown below, to specify that the systems and components tabulated in Table 3.2-3 as Equipment Class A, B, and C or identified in Table 3.11-1 as requiring seismic qualification are the systems and components necessary for continued operation in conformance with the applicable criteria in 10 CFR Part 50, Appendix S.

The capability of nonsafety-related SSCs to support power production following an OBE is an investment protection issue. Continued operation of the power production equipment is not

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required to protect the public health and safety. The systems and components important to reliable power production and which provide defense in depth functions are included in the D-RAP table in DCD Table 17.4-1. Seismic Category II structures, systems, and components are designed so that the safe shutdown earthquake does not cause unacceptable structural failure of or interaction with seismic Category I items. Operability is not required to be demonstrated for seismic Category II systems and components.

Post earthquake planning is the responsibility of the operators of the nuclear power plant and is not included in design certification.

Additional Westinghouse Response (Revision 1):

- a) Pre-earthquake planning is the responsibility of the combined license holder. The DCD in Subsection 3.7.5.2 identifies a COL information item for post-earthquake procedures. Combined License applicants referencing the AP1000 certified design will prepare site-specific procedures for activities following an earthquake. Identification of the post-earthquake procedure COL information item in the DCD provides sufficient information for the design certification amendment. The additional information provided in the DCD in Revision 0 of this response exceeds what is required for the review of the design certification amendment.
- b) The DCD COL information item for post-earthquake procedures includes a commitment that the post-earthquake procedures will follow the guidance of EPRI Reports NP-5930, TR-100082, and NP-6695. The AP1000 design relies on safety-related SSCs to minimize risk. The AP1000 does not rely on nonsafety-related SSCs that must remain functional to protect the health and safety of the public.
- c) The AP1000 DCD addresses the SRP 3.7.4 guidance on earthquake planning by the inclusion of the COL information item for post-earthquake procedures. The SRP 3.7.4 guidance includes a suggestion that "The reviewer should also consider the appropriateness of identified COL action items." The COL applicant has access to the design information to prepare the post-earthquake procedures.

The SSCs required for safe operation are the safety-related SSCs. The nonsafety-related SSCs, including the RTNSS SSCs, are needed for continued power production but are not relied upon to assure protection of the public health and safety. The nonsafety-related SSCs are not risk significant for post earthquake consideration.

- d) Regulatory Guide 1.166 is titled "Pre-earthquake Planning and Immediate Nuclear Power Plant Operator Postearthquake Actions." The regulatory guide is written to address procedural and operational guidance. The DCD addresses earthquake planning by including a COL information item for post-earthquake procedures. The COL information item commits to the guidance of EPRI Reports NP-5930, TR-100082, and NP-6695 but does not otherwise specify the criteria or contents of the procedures. The questions about list of systems are more appropriate as part of the COL application review. Westinghouse cannot commit to what the COL applicants will include in the post earthquake procedures. There is nothing in the DCD that would limit the ability of the COL applicant to address the guidance of Regulatory Guide 1.166.

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No additional DCD changes are proposed for Revision 1 of this response. The information added to the DCD in Revision 0 of this response was to address NRC questions. The information in the DCD relative to equipment classification criteria and application for safety-related and nonsafety-related classifications is otherwise not changed from the information in the certified design. If information added to the DCD in Revision 0 of this response is not acceptable to the NRC, Westinghouse suggests that the information be removed to return the DCD to what was approved in support of the certified design.

The safety evaluation report for the design certification found that the information provided in Section 3.2 of the DCD was sufficient and acceptable for the approval of the design certification. Since this information has not been changed or removed the information in the DCD must be acceptable for the design certification amendment.

Design Control Document (DCD) Revision:

Add the following to Subsection 3.2.1.1 ahead of the last paragraph.

Systems, and components identified as safety-related systems and components in Table 3.2-3 and electrical and instrumentation components identified in Table 3.11-1 are the systems, and components necessary for continued operation that must remain functional without undue risk of the health and safety of the public during and following an operating basis earthquake. Systems and components identified as Equipment Class A, B, and C in Table 3.2-3 and electrical and instrumentation components identified in Table 3.11-1 are the systems and components that per the criteria of 10 CFR Part 50, Appendix S, must be demonstrated, prior to resuming operations, to have no functional damage following a seismic ground motion exceeding the operating basis earthquake ground motion. See Section 3.7 for information on the operating basis earthquake.

PRA Revision:

None