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Subject: Chapter 7 of AP1000 Design Certification Amendment Review

This Westinghouse letter is in response to NRC letter ML090710662, dated March 24, 2009. Westinghouse would like to thank the NRC for its continued support of the review of Chapter 7 of the AP1000 Design Certification Amendment (DCA). This letter provides the schedule of expected completion dates for the documentation needed to complete the NRC's review of the Chapter 7 DCA. Westinghouse fully appreciates the schedule constraints and other challenges faced by the NRC in completing the review. Westinghouse has and will continue to provide full support of the NRC's review of the Instrumentation and Control (I&C) design for the staff to reach a conclusion on safety.

This letter addresses each of the four areas identified in NRC letter ML090710662:

- Diversity and Defense-in-Depth Analysis
- Component Interface Module
- Testing Methodology
- Technical Reports

Diversity and Defense-in-Depth Analysis

NRC Statement:
In Revision 17 of the AP1000 Tier 1 information, Westinghouse removed the design requirements phase and system definition phase from Item 4 in Table 2.5.1-4. These phases covered the hardware and software planning and requirements development phases for the AP1000 Diverse Actuation System. For these phases to be considered complete, the staff expects a design description that addresses Section 7.8 and Branch Technical Position 7-19 of NUREG-0800, Standard Review Plan (SRP). However, Revision 17 of the AP1000 Design Control Document (DCD) did not provide such design information. Westinghouse discussed some of the design aspects of the diverse actuation system with the staff at the December 11 - 12, 2008 audit. To complete the review such that the inspection, test, analyses, and acceptance criteria (ITAAC) phases can be accepted as complete, this information needs to be added (or specifically referenced) in the DCD and provided for staff review. The staff estimates this review could take about several months.

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Westinghouse Response:
To support the review and acceptance of the planning and requirements development phases for the AP1000 Diverse Actuation System (DAS), Westinghouse will provide the following documentation for NRC review:

Diverse Actuation System (DAS) DAC

1. Design Requirements Phase
   - APP-DAS-J4Y-001 – Ready for NRC review by April 30, 2009
2. System Definition Phase
   - APP-DAS-J1-001 – Rev B is available for NRC review
   - APP-DAS-J1-102 – Rev 3 is available for NRC review
   - APP-DAS-J1-103 – Rev 3 is available for NRC review
   - APP-DAS-J4-001 – Rev A is available for NRC review
3. Hardware and Software (if any) Development Phase
   - Documents available March 2010
4. System Test Phase - Will become ITAAC
5. Installation Phase - Will become ITAAC

Component Interface Module

NRC Statement:
In Revision 16 of the AP1000 Tier 1 information, Westinghouse removed the design requirements phase from Item 11 of Table 2.5.2-8 for the AP1000 Protection and Safety Monitoring System (PMS). The Component Interface Module (CIM) is a safety-related digital device that ensures the safety function has priority when commands are received from the safety-related protection and safety monitoring system and the non-safety related control system. WCAP-16675-P, "AP1000 Protection and Safety Monitoring System Architecture Technical Report," Revision 0, described the CIM in Section 5.1.5. However, the Staff found the description was inadequate with regards to addressing the requirements of 10 CFR 50.55a(h). Subsequently, RAI-SRP7.1-ICE-21 was transmitted to Westinghouse on May 1, 2008. Westinghouse responded to the RAI on November 24, 2008 with a high level response to the RAI, but stated that Revision 1 of WCAP-16674-P, "AP1000 I&C Data Communication and Manual Control of Safety Systems and Components," would contain the necessary information for the CIM. Westinghouse stated the revision would be provided in September 2008. However, the staff has not received Revision 1 of WCAP-16674-P.

The staff expects sufficient design information on the CIM that addresses the requirements in 10 CFR 50.55a(h) and other applicable regulations, as well as the SRP criteria to support completion of the ITAAC. If Westinghouse proposes the use of design ITAAC to address software quality of the CIM (since information isn't yet available to close the PMS ITAAC completely for this component), such criteria would need to be added to the DCD. This review could also take several months.

Westinghouse Response:
The design requirements for the CIM design are complete. The detailed design is ongoing. Additional details on the CIM are included in WCAP-16674-P, "AP1000 I&C Data Communication and Manual Control of Safety Systems and Components", and WCAP-16675-P, AP1000 Protection and Safety Monitoring System Architecture Technical Report". These documents will be available for NRC review per the below schedule:

- WCAP-16674-P, "AP1000 I&C Data Communication and Manual Control of Safety Systems and Components" – Ready for NRC review May 29, 2009

- WCAP-16675-P, "AP1000 Protection and Safety Monitoring System Architecture Technical Report" – ready for NRC review May 29, 2009

Testing Methodology

NRC Statement:
In Revision 16 of AP1000 Tier 1 information, Westinghouse removed the design requirements phase from Item 11 of Table 2.5.2-8. The design requirements phase addressed the software planning life cycle phase for the AP1000 safety-related software. Specifically, the criteria for a software test plan is discussed in the Common Q Software Program Manual (SPM) that was approved for use by the NRC, along with other supplemental required documents, in the development of the AP1000 specific safety system. The staff found a lack of information regarding the testing of various components and systems that are a part of the AP1000 I&C safety or important to safety systems, that is required by the SPM. Examples of subject matter not providing sufficient detail include:

- Requirements for testing including: test boundary conditions on inputs and unexpected input conditions
- Test management including: personnel, resources, organization, and responsibilities
- Procedures for qualification and control of the hardware to be used in testing
- Qualification and use of software tools
- Installation test requirements for existing software that is used without modification
- Regression test requirements for previously qualified software to be modified

The staff submitted RAI-SRP7.1-ICE-05 on May 1, 2008 to request information regarding these items. The staff also interacted with Westinghouse personnel in subsequent meetings regarding this issue and reviewed software test plan documentation, but was unable to identify all information needed to address the bullets above. The staff expects a demonstration of how all the criteria for a software test plan are met by the AP1000 design documentation. This portion of the review would require approximately two months.

Westinghouse Response:
This issue is related to RAI-7.1-ICE-05, which is currently in WEC review. A response will be submitted to the NRC by April 24, 2009. The following related documents have all been submitted to Rockville for NRC review:

1. WNA-PT-00058-GEN, Rev. 0, "Testing Process for Common Q Safety Systems," Westinghouse Electric Company LLC.
2. WCAP-16096-NP-A, Rev. 1A, "Software Program Manual for Common Q Systems," Westinghouse Electric Company LLC.
3. WNA-PD-00042-WAPP, Rev. 1, "NuStart/DOE Design Finalization Protection and Safety Monitoring System Software Development Plan," Westinghouse Electric Company LLC

Technical Reports

NRC Statement:
Listed below are technical reports (TRs), which cover subject matter crucial to the staff's capability to adequately understand a given topic or subject. Over the past year, Westinghouse has committed to providing these revised reports to the NRC, but the staff has not received them.

- WCAP-16674-P, "AP1000 I&C Data Communication and Manual Control of Safety Systems and Components," Revision 1. Original Revision 0 was submitted to the staff, but a Revision 1 exists. WCAP 16775-P references WCAP 16674-P and the description of the CIM is proposed to be in Revision 1 according to the response to RAISRP7.1-ICE-21.

- WCAP-16775-P, "AP1000 Protection and Safety Monitoring System (PMS) Architecture Technical Report," Revision 1. Revision 17 of the AP1000 design control document references this revision.

- WCAP-15927-NP, "Design Process for AP1000 Common Q Safety Systems," Revision 1. Revision 1 of this document is a Tier 2* document in the AP1000 design control document.

Westinghouse Response:
The status of two of the WCAPs has been addressed under the Component Interface Module item above. The availability dates for all three documents are as follows:

- WCAP-16674-P, "AP1000 I&C Data Communication and Manual Control of Safety Systems and Components" – Ready for NRC review May 29, 2009

- WCAP-16675-P, "AP1000 Protection and Safety Monitoring System Architecture Technical Report" – ready for NRC review May 29, 2009

- WCAP - 15927-NP, "Design Process for AP1000 Common Q Safety Systems," Revision 1, was submitted to Rockville for NRC review.

Summary
In conclusion, Westinghouse again would like to thank the NRC for its continued support of the Chapter 7 review of the AP1000 Design Certification Amendment (DCA). Westinghouse will continue to provide the full support and timely submittals needed to allow the staff to reach a timely conclusion on the safety of the Instrumentation and Control design.

Very truly yours,

Robert Sisk, Manager
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