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Your ref: Docket No. 52-006
Our ref: DCP_NRC_002527

June 9, 2009

Subject: AP1000 Response to Request for Additional Information (SRP 7)


Westinghouse is submitting a response to the NRC request for additional information (RAI) on SRP Section 7. 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-SRP7.1-ICE-19 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,


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

/Enclosure

1. Response to Request for Additional Information on SRP Section 7

cc:	D. Jaffe	- U.S. NRC	1E
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ENCLOSURE 1

Response to Request for Additional Information on SRP Section 7

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Response to Request For Additional Information (RAI)

RAI Response Number: RAI-SRP7.1-ICE-19
Revision: 1

Question (Revision 0):

Demonstrate the basis for concluding the Remote Node Controller (RNC) is not performing a safety function and can be defined as an associated circuit per IEEE Standard 603-1991.

IEEE Standard 603-1991 defines associated circuits as non-Class 1E circuits that are not physically separated or are not electrically isolated by acceptable separation distance, safety class structures, barriers or isolation devices. Since the RNC is powered by the safety system and Figure 3-1 of WCAP 16675-P shows the device to be within the Class 1E boundary (i.e. safety-related side of the electrical isolation device), the RNC does not appear to meet the definition of an associated circuit.

Westinghouse Response (Revision 0):

IEEE Standard 603-1991 defines the following terms:

“Associated circuit. Non-Class 1E circuits that are not physically separated or are not electrically isolated from Class 1E circuits by acceptable separation distance, safety class structures, barriers, or isolation devices.”

“Class 1E. The safety classification of the electrical equipment and systems that are essential to emergency reactor shutdown, containment isolation, reactor core cooling, and containment and reactor heat removal, or are otherwise essential in preventing significant release of radioactive material to the environment.”

Therefore, there are two criteria essential to an associated circuit:

- 1) The functions performed must NOT be essential to emergency reactor shutdown, containment isolation, reactor core cooling, and containment and reactor heat removal, or are otherwise essential in preventing significant release of radioactive material to the environment.
- 2) The circuits are not physically separated or are not electrically isolated from Class 1E circuits by acceptable separation distance, safety class structures, barriers, or isolation devices.

The Remote Node Controller (RNC) is functionally a portion of the communication path between the Non-Class 1E Plant Control System (PLS) and the Component Interface Modules (CIMs) in the Class 1E Plant Safety and Monitoring System (PMS). Specifically its function is to translate messages between the communication formats used on the fiber-optic Remote I/O Bus (from

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PLS) and the electrical Local I/O Bus (for the CIMs). Communication with the Non-Class 1E plant control system is a Non-Class 1E function. Thus, the first criterion is met. (The basis for AP1000 manual component-level control being a Non-Class 1E function is discussed in the response to RAI SRP-7.3-ICE-01.)

The RNC is mounted within the PMS cabinets without any physical separation from other PMS equipment. It is powered from the PMS power supplies without any credited isolation and is electrically connected to the CIMs. Thus, the second criterion is met.

Although the IEEE 603-1991 definition of "Class 1E" is functional in nature, the use of the term to label isolation barriers is common practice. The staff correctly interpreted the intent of the symbol in Figure 3-1 of WCAP 16675-P as being the electrical isolation barrier (as opposed to the functional barrier.) The RNC is shown on the Class 1E side of the barrier since it is electrically connected to the remainder of the PMS equipment.

References:

- 1) WCAP 16675 P, Revision 0, "AP1000 Protection and Monitoring System Architecture Technical Report," Westinghouse Electric Company LLC, February 2007.
- 2) IEEE 603-1991, "IEEE Standard Criteria for Safety Systems for Nuclear Power Generating Stations," Institute of Electrical and Electronics Engineers, 1991.

Westinghouse REVISED response based on NRC comments from the January 29-30 meeting (Revision 1):

The Associated Class 1E equipment shall meet the requirements of IEEE Std. 384-1992 Clause 5.5.2 and Clause 5.5.3. Specifically, it shall be part of the safety system qualification program that will demonstrate that when it is subject to environmental, electromagnetic, and seismic stressors, it does not degrade the Class 1E circuits below an acceptable level.

Reference:

- 1) IEEE 384-1992, "IEEE Standard Criteria for Independence of Class 1E Equipment and Circuit," Institute of Electrical and Electronics Engineers, 1992.

Design Control Document (DCD) Revision:

None

PRA Revision:

None

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Technical Report (TR) Revision:

None