



March 5, 2009

Mr. Michael R. Johnson  
Director, Office of New Reactors  
U.S. Nuclear Regulatory Commission  
Washington, DC 20555-0001

Subject: Safety Concern - Flawed Electrical Design,  
AP1000 and ESBWR Plants

Dear Mr. Johnson:

While perusing the Westinghouse AP1000 and GE-Hitachi ESBWR Design Control Documents (DCDs), I have noted that both designs rely on Ancillary Diesel Generators for post-accident power. Both DCDs state that power from these Ancillary Diesel Generators is required to support safety related loads after 72 hours following an abnormal event and loss of all other ac power sources; however, both AP1000 and ESBWR have classified these ac power sources as commercial grade, non-safety related, and non-Class 1E as noted below:

- Section 8.3.1.1.3 of the AP1000 DCD states (see ML083230349): "Power for Class 1E post-accident monitoring, MCR lighting, MCR and divisions B and C I&C room ventilation and for refilling the PCS water storage tank and the spent fuel pool when no other sources of power are available is provided by two ancillary ac diesel generators located in the annex building. The ancillary generators are not needed for refilling the PCS water storage tank, spent fuel pool makeup, post-accident monitoring or lighting for the first 72 hours following a loss of all other ac sources. The generators are classified as AP1000 Class D. The generators are commercial, skid-mounted, packaged units and can be easily replaced in the event of a failure. Generator control is manual from a control integral with the diesel skid package. These generators are located in the portion of the Annex Building that is a Seismic Category II structure. Features of this structure which protect the function of the ancillary generators are analyzed and designed for Category 5 hurricanes, including the effects of sustained winds, maximum gusts, and associated wind-borne missiles."

- Section 8.3.1.1.9 of the ESBWR DCD states (see ML081820555): “Two nonsafety-related ancillary diesel generators provide post accident power to the loads designated on Figure 8.3-3 when no other sources of power are available. Refer to Appendix 19A for further discussion of the ancillary diesel generator augmented design requirements. The ancillary diesel generators are Seismic Category II, as are their associated auxiliaries, controls, electrical buses, and fuel oil tanks. (See Subsection 9.5.4 for discussion of fuel oil tanks.) The diesels and associated equipment are housed in a Seismic Category II structure. The ancillary power is not required to support safety-related loads for the first 72 hours following the loss of all other AC power sources. See Figure 8.1-4 for the isolated ancillary power connection to safety-related loads.”

These designs are flawed because they have failed to comply with the requirements of IEEE Standard 603 requiring the electrical portion of the safety systems that perform safety functions to be classified as Class 1E. The requirements of IEEE 603 are applicable regardless of whether the safety function is to be performed after 72 hours and beyond.

IEEE Standard 603 is endorsed by NRC Regulatory Guide 1.153, and defines the functional requirements of the Safety System, and directs that electrical portions of the Safety System be classified as Class 1E. The definition of the term “Safety System” in IEEE 603 references 10CFR Part 100 and is in agreement with the definition used by the American Nuclear Society (ANS) and IEC 60231A. The term Class 1E is defined as: “The safety classification of the electric 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”.

Though both the AP1000 and ESBWR DCDs indicate compliance, without exceptions, to IEEE 603 and Regulatory Guide 1.153; the designs of the Ancillary Diesel Generators are in fact not compliant with these documents, and are therefore technically flawed.

Please consider the above Safety Concern in your ongoing evaluation in determining the acceptability of the AP1000 and ESBWR designs to operate safely and in full compliance with committed industry standards and NRC regulations. I would appreciate knowing your final disposition.

Sincerely,



Farouk D. Baxter, PE  
Consultant – Specialist  
Nuclear Power Plant Electrical Systems