



Westinghouse Electric Company
Nuclear Power Plants
P.O. Box 355
Pittsburgh, Pennsylvania 15230-0355
USA

U.S. Nuclear Regulatory Commission
ATTENTION: Document Control Desk
Washington, D.C. 20555

Direct tel: 412-374-6206
Direct fax: 724-940-8505
e-mail: sisk1rb@westinghouse.com

Your ref: Docket No. 52-006
Our ref: DCP_NRC_002801

March 2, 2010

Subject: AP1000 Response to Proposed Open Item (Chapter 8)

Westinghouse is submitting the following responses to the NRC open item (OI) on Chapter 8. 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-SRP8.3.2-EEB-04

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 8)

DD63
NRD

cc:	D. Jaffe	- U.S. NRC	1E
	E. McKenna	- U.S. NRC	1E
	C. Proctor	- 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
	E. Schmiech	- Westinghouse	1E
	G. Zinke	- NuStart/Entergy	1E
	R. Grumbir	- NuStart	1E
	B. Seelman	- Westinghouse	1E

ENCLOSURE 1

AP1000 Response to Proposed Open Item (Chapter 8)

AP1000 TECHNICAL REPORT REVIEW

Response to Request For Additional Information (RAI)

RAI Response Number: OI-SRP8.3.2-EEB-04
Revision: 0

Question: OI-SRP8.3.2-EEB-04

In RAI-SRP8.3.2-EEB-04, the NRC staff requested that the applicant describe how the 24-hour and the 72-hour 250 Vdc batteries would be qualified for service life. If safety-related batteries will be qualified using the recommendations of IEEE Standard 535, "Standard for Qualification of Class 1 E Lead Storage Batteries for Nuclear Power Generating Stations," it is not clear how the standard applies since the standard was written under the assumption of an 8-hour duty cycle. Since AP1000 design duty cycles are significantly longer than 8-hour duty cycle and IEEE Standard 535 does not apply to duty cycles longer than 8 hours, describe how these batteries will be qualified for extended duty cycles of 24-hours and 72-hours. The applicant was also asked to discuss the failure mode(s) for both the 24-hours and 72-hour duty cycle batteries. In the response to the RAI dated May 7, 2009, the applicant stated that it intends to qualify the AP1000 safety-related batteries for 24-hour and 72-hour duty cycles through the implementation of industry standards IEEE standard 323-1974, IEEE Standard 344-1987, and IEEE Standard 535-1986 as they apply to the equipment.

The qualification process for the AP1000 24-hour and 72-hour duty cycle batteries will be outlined in a test plan. Qualification of the batteries will be accomplished by type testing of both duty cycle designs to the AP1000 service conditions associated with their projected service life. In the qualification process, the batteries will be subjected to aging (thermal, wear/operational), abnormal environmental and seismic conditions. There are no radiation and normal vibration conditions associated with the mounting locations of the batteries. Aging under normal and abnormal service conditions will be performed to degrade batteries to their end-of-life such that the safety function after the design basis event (seismic) can be verified.

The aging conditions will include both electrical (chemical) cycling and thermal accelerated aging. Electrical (chemical) cycling will be performed in compliance with IEEE Standard 323. The proposed electrical (chemical) cycling is in line with Section 8.2.2 (6) of IEEE Standard 535-1986 for cases when the service conditions are more severe than those specified within the standard. The electrical (chemical) cycling of the batteries is based on the AP1000 maintenance/surveillance requirements with no less than 10 percent margin. During the testing process the service and performance tests will be performed in conjunction with the thermal accelerated aging test of the batteries to place the batteries in an end-of-life condition. Upon completion of the battery aging, abnormal environmental testing to the AP1000 mild environment abnormal conditions will be performed. Following the abnormal environmental testing, seismic testing and a hard rock high frequency screening test will be performed. At the completion of seismic testing, a post-seismic battery service test will be performed. The service test is used to demonstrate equipment functionality during and after the design basis event (seismic) which is a requirement per IEEE Standard 344 and IEEE Standard 323. This is

AP1000 TECHNICAL REPORT REVIEW

Response to Request For Additional Information (RAI)

different from IEEE Standard 535, which only requires a performance test to be performed. In the process of performing the qualification testing of the AP1000 batteries, the program will identify any failure mechanisms that may surface during the projected service life in an AP1000 plant.

In a conference call of May 21, 2009, the NRC staff requested that the applicant provide its step-by-step, detailed qualification test plan showing testing for desired qualified life of the batteries. The applicant has not provided its qualification test plan for the batteries as requested by the staff. The NRC staff will provide its evaluation of the qualification plan after submittal of the test plan by the applicant. This is Open Item OI-SRP8.3.2-EEB-04.

Westinghouse Response OI-SRP8.3.2-EEB-04:

The "AP1000 Test Plan for Safety Related 250 Vdc Batteries" EQ-TP-59-APP (APP-DB01-VPH-001), Revision 0 will be submitted to the Westinghouse Twinbrook office for NRC review the week of March 1st 2010. The qualified life of the batteries is to be 20 years; however, this methodology can be modified to apply to batteries with a shorter qualified life. The qualification will be based on the requirements of APP-GW-VP-100 (Reference 1), IEEE Std 323-1974 (Reference 2), IEEE Std 344-1987 (Reference 3), and IEEE Std 535-1986 (Reference 4). Qualification of the Class 1E batteries will be performed by testing. Due to the difference in duty cycle, the test sequence will be performed on two groups of test cells. One group will be cycled and tested to the 24 hr duty cycle for AP1000 and the other group will be cycled and tested to the 72 hr duty cycle for AP1000.

References:

1. APP-GW-VP-100, "Equipment Qualification Specifications and Documentation Requirements for AP1000 Safety-Related Electrical and Electro-Mechanical Equipment"
2. IEEE Std 323-1974, "IEEE Standard for Qualifying Class 1E Equipment for Nuclear Power Generating Stations"
3. IEEE Std 344-1987, "IEEE Recommended Practice for Seismic Qualification of Class 1E Equipment for Nuclear Power Generating Stations"
4. IEEE Std 535-1986, "IEEE Standard for Qualification of Class 1E Lead Storage Batteries for Nuclear Power Generating Stations"

Design Control Document (DCD) Revision:

None

PRA Revision:

None

AP1000 TECHNICAL REPORT REVIEW

Response to Request For Additional Information (RAI)

Technical Report (TR) Revision:
None