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Your ref: Project Number 740
Our ref: DCP/NRC1735

May 22, 2006

Subject: AP1000 COL Technical Report Submittal

In support of Combined License application pre-application activities, Westinghouse has been preparing and reviewing standard changes to the Design Control Document. These changes are intended to be incorporated into FSARs referencing the AP1000 design certification or incorporated into the design certification using supplemental rulemaking when 10 CFR Part 52 is revised to permit such changes.

Criteria in 10 CFR Part 52 Appendix D Section VIII B. 5. a, b, and c provide for changes in Tier 2 of the Design Control Document that do not require prior NRC approval. The changes included in this report satisfy these criteria. The changes are generic and are expected to apply to all projects referencing the AP1000 Design Certification. This information is submitted as part of the NuStart Bellefonte COL Project (NRC Project Number 740).

Pursuant to 10 CFR 50.30(b), APP-GW-GLN-006, Rev. 0, "Methodology for Qualifying AP1000 Safety Related Electrical and Mechanical Equipment," (Technical Report Number 62), is submitted as Enclosure 1 under the attached Oath of Affirmation.

The reviews of these changes were included in a table of COL technical reports in a March 8, 2006 letter from NuStart to the NRC.

Questions or requests for additional information related to the content and preparation of these reports 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. Sterdis, Manager
Licensing and Customer Interface
Regulatory Affairs and Standardization

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3770alf.doc

/Attachment

1. "Oath of Affirmation," dated May 22, 2006

/Enclosure

1. APP-GW-GLN-006, Rev. 0, "Methodology for Qualifying AP1000 Safety Related Electrical and Mechanical Equipment," (Technical Report Number 62)

cc:	S. Bloom	-	U.S. NRC	1A	1E
	G. Curtis	-	TVA	1A	
	L. Dudes	-	U.S. NRC	1A	1E
	P. Grendys	-	Westinghouse	1A	
	P. Hastings	-	Duke Power	1A	
	C. Ionescu	-	Progress Energy	1A	
	D. Lindgren	-	Westinghouse	1A	
	A. Monroe	-	SCANA	1A	
	C. Pierce	-	Southern Company	1A	
	E. Schmiech	-	Westinghouse	1A	
	G. Zinke	-	NuStart/Entergy	1A	

ATTACHMENT 1

Oath of Affirmation

ATTACHMENT 1

UNITED STATES OF AMERICA

NUCLEAR REGULATORY COMMISSION

In the Matter of:	)
NuStart Bellefonte COL Project	)
NRC Project Number 740	)

APPLICATION FOR REVIEW OF
"AP1000 GENERAL COMBINED LICENSE INFORMATION"
FOR COL APPLICATION PRE-APPLICATION REVIEW

Stephen R. Tritch, being duly sworn, states that he is President and CEO for Westinghouse Electric Company; that he is authorized on the part of said company to sign and file with the Nuclear Regulatory Commission this document; that all statements made and matters set forth therein are true and correct to the best of his knowledge, information and belief.

Stephen R. Tritch
President and CEO

Subscribed and sworn to
before me this 22nd day
of May 2006.

Lorraine M. Piplica
Notary Public

COMMONWEALTH OF PENNSYLVANIA
Notarial Seal
Lorraine M. Piplica, Notary Public
Monroeville Boro, Allegheny County
My Commission Expires Dec. 14, 2007
Pennsylvania Association Of Notaries

ENCLOSURE 1

APP-GW-GLN-006, Rev. 0

"Methodology for Qualifying AP1000 Safety Related Electrical and Mechanical Equipment"

Technical Report Number 62

AP1000 DOCUMENT COVER SHEET

TDC: _____ Permanent File: _____ APY: _____

RFS#: _____ RFS ITEM #: _____

AP1000 DOCUMENT NO.	REVISION NO.		ASSIGNED TO
APP-GW-GLN-006	0	Page 1 of 8	W-A. Sterdis

ALTERNATE DOCUMENT NUMBER: WORK BREAKDOWN #:

ORIGINATING ORGANIZATION: Westinghouse Electric Company

TITLE: **Methodology for Qualifying AP1000 Safety Related Electrical and Mechanical Equipment**

ATTACHMENTS:	DCP #/REV. INCORPORATED IN THIS DOCUMENT REVISION:
CALCULATION/ANALYSIS REFERENCE:	

ELECTRONIC FILENAME	ELECTRONIC FILE FORMAT	ELECTRONIC FILE DESCRIPTION
APP-GW-GLN-006	Microsoft Word	

ORIGINATOR	SIGNATURE/DATE
R. Wessel	R Wessel 5/9/06
REVIEWERS	SIGNATURE/DATE

VERIFIER	SIGNATURE/DATE	VERIFICATION METHOD
D. A. LINDGREN	5/9/06	PAGE BY PAGE REVIEW
AP1000 RESPONSIBLE MANAGER	SIGNATURE*	APPROVAL DATE
K. Quinn		5/16/06

* Approval of the responsible manager signifies that document is complete, all required reviews are complete, electronic file is attached and document is released for use.

Document Number: APP-GW-GLN-006 **Revision Number:** 0

Title: Methodology for Qualifying AP1000 Safety-Related Electrical and Mechanical Equipment – Use of Qualification by Analysis

Brief Description of the change (what is being changed and why):

During the detailed development of the Methodology for Qualifying AP1000 Safety-Related Electrical and Mechanical Equipment, it was determined that clarification is required to the DCD for seismic qualification by analysis to be consistent with the current industry standards and practices. Also, clarification is provided to ensure that when qualification by analysis is conducted using the Static Coefficient Method it is performed in a manner that yields conservative results. The methodology of Seismic qualification based on experience will continue to be performed in accordance with Section 9.0 of IEEE 344-1987. The details of the methodology, qualification basis, and supporting data will be executed in accordance with the delineation and details provided in IEEE 344-2004. The updated equipment qualification methodology sections satisfy the AP1000 design criteria and specifications.

I. APPLICABILITY DETERMINATION

This evaluation is prepared to document that the change described above is a departure from Tier 2 information of the AP1000 Design Control Document (DCD) (APP-GW-GL-700) that may be included in plant specific FSARs without prior NRC approval.

A.	Does the proposed change include a change to:		
	1. Tier 1 of the AP1000 Design Control Document APP-GW-GL-700	☒ NO ☐ YES	(If YES prepare a report for NRC review of the changes)
	2. Tier 2* of the AP1000 Design Control Document, APP-GW-GL-700	☒ NO ☐ YES	(If YES prepare a report for NRC review of the changes)
	3. Technical Specification in Chapter 16 of the AP1000 Design Control Document, APP-GW-GL-700	☒ NO ☐ YES	(If YES prepare a report for NRC review of the changes)
B.	Does the proposed change involve:		
	1. Closure of a Combined License Information Item identified in the AP1000 Design Control Document, APP-GW-GL-700	☒ NO ☐ YES	(If YES prepare a COL item closure report for NRC review.)
	2. Completion of an ITAAC item identified in Tier 1 of the AP1000 Design Control Document, APP-GW-GL-700	☒ NO ☐ YES	(If YES prepare an ITAAC completion report for NRC review.)

☒ The questions above are answered no, therefore the departure from the DCD does not require prior NRC review unless review is required by the criteria of 10 CFR part 52 Appendix D Section VIII B.5.b. or B.5c

II. TECHNICAL DESCRIPTION AND JUSTIFICATION

The changes are being made to be consistent with the practices of IEEE 344-1987, "IEEE Recommended Practice for Seismic Qualification of Class 1E Equipment for Nuclear Power Generating Stations." Clause 6, (Analysis) which states "The analysis method is not recommended for complex equipment that cannot be modeled to adequately predict its response. Analysis without testing may be acceptable only if structural integrity alone can ensure the design-intended function."

Document Number: APP-GW-GLN-006 **Revision Number:** 0

Title: Methodology for Qualifying AP1000 Safety-Related Electrical and Mechanical Equipment – Use of Qualification by Analysis

The changes and justifications are listed below:

In Subsection 3.10.2 reference to IEEE 344-2004 is added for additional information on experience method. The information in IEEE 344-2004 provides criteria for qualification by test experience that were not included in the 1987 version. Requirements for methodology, qualification basis, and reference test data are included.

The change is to ensure that when qualification by experience is used, the efforts will follow the delineation and details provided in IEEE 344-2004 and that the efforts when applied are performed consistently with each other and with the current standards.

In Subsection 3D.6.2 the use of analysis is clarified by deleting a contradictory paragraph. This proposed change brings this subsection to be consistent with IEEE 344-1987. It does not introduce new qualification methods or qualification criteria.

In Subsection E.3.2 the sentence that says that qualification analysis alone is not permitted is revised to define circumstances when it is permitted. This proposed change makes this paragraph consistent with IEEE 344-1987. This change replaces the current rigid restriction on use of analysis to allow its use in a conservative manner using and in accordance with the industry practices, IEEE standards and the regulatory guides.

In Subsection E.6.3.2 the use of the static coefficient is clarified. Information is added to clarify that use of a static coefficient lower than 1.5 is permissible when it is clearly demonstrated that conservative results are attainable.

III. DCD MARK-UP

Revise the last paragraph of Subsection 3.10.2 as follows:

3.10.2 Methods and Procedures for Qualifying Electrical Equipment, Instrumentation, and Mechanical Components

The seismic qualification of ~~Class 1E~~ safety-related equipment ~~and active valves and dampers~~ may be based on properly documented experience data. *[Seismic qualification based on experience is performed in accordance with Section 9.0 of IEEE 344-1987 on a case by case basis. In such cases where experience data are used, aspects of the methodology, qualification basis, and supporting data will be properly documented by the Combined License applicant.]** **The methodology, qualification basis, and reference test data for seismic qualification based on test experience are documented in accordance with the processes and details provided in Sections 10 and 11 of IEEE 344-2004 (Reference 2).** Identification of the specific equipment qualified based on experience and the details of the methodology and the corresponding ~~experience~~ **reference test data** for each piece of equipment are included in the equipment qualification file. The Combined License applicant will identify the specific equipment and

include details of the methodology and the corresponding experience data for each piece of equipment.

Add the following reference to Subsection 3.10.7

2. **IEEE 344-2004," Recommended Practices for Seismic Qualification of Class 1E Equipment for Nuclear Power Generating Stations."**

Revise first two paragraphs of Subsection 3D.6.2 to read as follows:

The AP1000 equipment qualification program uses analysis for seismic qualification of equipment if the primary requirement is the demonstration of structural integrity during a seismic event. For equipment that performs an active or dynamic function, seismic qualification by analysis may also be used **(See Section E.3 of Attachment E).** However, the similarity between a qualified test unit and an as-supplied unit must be demonstrated **unless otherwise justified.** ~~(See Section E.3 of Attachment E.).~~ Subsection 3.9.2.2 describes the qualification requirements for safety-related mechanical equipment where a fluid pressure boundary is involved. For those mechanical components that are not pressure boundaries, analysis is performed in compliance with the applicable industry design standard. Where age-sensitive materials, such as gaskets and packing, are used in the assembly of mechanical equipment, the aging of these materials is normally evaluated based on an item-by-item review of the aging characteristics of the material. (See subsection 3D.6.2.3.)

~~The AP1000 equipment qualification program does not establish seismic and environmental qualification of Class 1E electrical or electromechanical equipment for design basis event conditions on the bases of analyses alone. Analysis is employed to supplement testing or to provide verification that the test results are applicable. The following subsections provide examples of the necessary and sufficient conditions under which analysis will be applied in the qualification of safety related equipment for the AP1000.~~

Revise the last sentence of Appendix D Attachment E, Subsection E.3.2 as follows:

Seismic Qualification of safety-related ~~electrical~~ equipment by analysis ~~alone~~ is not ~~permitted~~ **recommended for complex equipment that cannot be modeled to adequately predict its response. Analysis without testing may be acceptable provided structural integrity alone can ensure the design-intended function.**

Revise the last paragraph of Appendix D Attachment E, Subsection E.6.3.2 as follows:

As an alternative to the response spectrum method, the static coefficient method of analysis may be used. In this method the frequencies of the equipment are not determined, but a static analysis

is performed, assuming that a peak acceleration equal to 1.5 times the peak spectral acceleration given in the applicable required response spectrum acts on the structure **as described in Subsection E.6.2. The static coefficient of 1.5 takes into account the combined effects of multi-frequency excitation and multimode response for equipment and structures which can be represented by a simple model. A lower static coefficient may be used when it can be demonstrated that it will yield conservative results.**

IV. REGULATORY IMPACT

A. FSER IMPACT

There is no impact on the FSER. The changes in the equipment qualification methodology have no effect on design function. This change has no effect on analysis or analysis method. This change has no effect on Tier 1 information.

B. SCREENING QUESTIONS (Check correct response and provide justification for that determination under each response)

1. Does the proposed change involve a change to an SSC that adversely affects a DCD described design function? ☐ YES ☒ NO

   There is no change to a design function of any safety related equipment.

2. Does the proposed change involve a change to a procedure that adversely affects how DCD described SSC design functions are performed or controlled? ☐ YES ☒ NO

   The clarifications in the equipment qualification methodology have no effect on operation of the reactor coolant system. The clarifications have no effect on the initiation or operation of the passive core cooling system.

3. Does the proposed activity involve revising or replacing an DCD described evaluation methodology that is used in establishing the design bases or used in the safety analyses? ☐ YES ☒ NO

   The changes to the equipment qualification methodology do not require changes to the evaluation of the response to postulated accident conditions. The changes to the equipment qualification methodology do not require changes to the structural or safety analysis of any safety related equipment. The removal of a statement that qualification by analysis alone is no used is not a change in methodology since it is in conflict with information in Appendix 3D on requirements for qualification by analysis.

4. Does the proposed activity involve a test or experiment not described in the DCD, where an SSC is utilized or controlled in a manner that is outside the reference bounds of the design for that SSC or is inconsistent with analyses or descriptions in the DCD? ☐ YES ☒ NO

   The changes to the equipment qualification methodology do not require an additional test or experiment or changes to testing.

C. EVALUATION OF DEPARTURE FROM TIER 2 INFORMATION (Check correct response and provide justification for that determination under each response)

10 CFR Part 52, Appendix D, Section VIII. B.5.a. provides that an applicant for a combined licensee who references the AP1000 design certification may depart from Tier 2 information, without prior NRC approval, if it does not require a license amendment under paragraph B.5.b. The questions below address the criteria of B.5.b.

1. Does the proposed activity result in more than a minimal increase in the frequency of occurrence of an accident previously evaluated in the plant-specific DCD? ☐ YES ☒ NO

   Since there is no change to the equipment qualification methodology that could affect the plant design or operations, there are no new accident initiators and no effect on the frequency of evaluated accidents.

2. Does the proposed activity result in more than a minimal increase in the likelihood of occurrence of a malfunction of a structure, system, or component (SSC) important to safety and previously evaluated in the plant-specific DCD? ☐ YES ☒ NO

   Since there is no change to the equipment qualification methodology that could affect the plant design or operations, there is no effect on malfunctions of structures, systems, or components. The operating conditions for the reactor coolant system and passive core cooling system are not altered.

3. Does the proposed activity result in more than a minimal increase in the consequences of an accident previously evaluated in the plant-specific DCD? ☐ YES ☒ NO

   The clarifications in the qualification methodology have no effect on the operation, performance, and pressure boundary integrity of the safety related equipment. Therefore, there is no increase in the calculated release of radioactive material during postulated accident conditions.

4. Does the proposed activity result in more than a minimal increase in the consequences of a malfunction of an SSC important to safety previously evaluated in the plant-specific DCD? ☐ YES ☒ NO

   The clarifications in the qualification methodology have no effect on the design functions or reliability of the safety related equipment or other components and operation of the passive core cooling system. Therefore, there is no increase in the calculated release of radioactive material due to a malfunction of an SSC.

5. Does the proposed activity create a possibility for an accident of a different type than any evaluated previously in the plant-specific DCD? ☐ YES ☒ NO

The clarifications in the equipment qualification methodology have no effect on the operation, performance, and pressure boundary integrity of the plant equipment. The response of the safety related equipment and the passive core cooling system to postulated accident conditions is not altered by the changes. The changes do not introduce any additional failure modes. Therefore, there is no possibility of an accident of a different type than any evaluated previously in the DCD.

6. Does the proposed activity create a possibility for a malfunction of an SSC important to safety with a different result than any evaluated previously in the plant-specific DCD? ☐ YES ☒ NO

   The changes have no effect on the design functions of the safety related equipment or operation of the passive core cooling system. Therefore, there are no additional failure modes or the possibility for a malfunction of an SSC important to safety with a different result than any evaluated previously.

7. Does the proposed activity result in a design basis limit for a fission product barrier as described in the plant-specific DCD being exceeded or altered? ☐ YES ☒ NO

   There is no change to the design function of the safety related equipment. The criteria to provide for pressure boundary integrity are not exceeded or altered.

8. Does the proposed activity result in a departure from a method of evaluation described in the plant-specific DCD used in establishing the design bases or in the safety analyses? ☐ YES ☒ NO

   The changes are provided as clarification to the equipment qualification methodology of safety related equipment. A paragraph stating analysis alone is not used was removed since it was in conflict with information in Appendix 3D defining the conditions under which the analysis method may be used. Since the requirements for qualification using analysis are included in Appendix 3D, deleting the conflicting paragraph is not a change in methodology. The method described is consistent with IEEE standards and industry practice and employed in a manner that yields conservative results and have been approve by the NRC for qualification of equipment in operating nuclear plants. The changes have no impact on the evaluation methodology for the pressure boundary integrity.

☒ The answers to the evaluation questions above are "NO" and the proposed departure from Tier 2 does not require prior NRC review to be included in plant specific FSARs as provided in 10 CFR Part 52, Appendix D, Section VIII. B.5.b

☐ One or more of the answers to the evaluation questions above are "YES" and the proposed change requires NRC review.

D. IMPACT ON RESOLUTION OF A SEVERE ACCIDENT ISSUE

10 CFR Part 52, Appendix D, Section VIII. B.5.a. provides that an applicant for a combined licensee who references the AP1000 design certification may depart from Tier 2 information, without prior NRC approval, if it does not require a license amendment under paragraph B.5.c. The questions below address the criteria of B.5.c.

1. Does the proposed activity result in an impact features that mitigate severe accidents. If the answer is Yes answer Questions 2 and 3 below. ☐ YES ☒ NO

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The systems and components identified in the DCD Subsection1.9.5 and Appendix 19 B that mitigate severe accidents are not impacted by a change in equipment qualification methodology.

2. Is there is a substantial increase in the probability of a severe accident such that a particular severe accident previously reviewed and determined to be not credible could become credible? ☐ YES ☐ NO ☒ N/A

3. Is there is a substantial increase in the consequences to the public of a particular severe accident previously reviewed? ☐ YES ☐ NO ☒ N/A

☒ The answers to the evaluation questions above are "NO" or are not applicable and the proposed departure from Tier 2 does not require prior NRC review to be included in plant specific FSARs as provided in 10 CFR Part 52, Appendix D, Section VIII. B.5.c

☐ One or more of the he answers to the evaluation questions above are "YES" and the proposed change requires NRC review.

E. SECURITY ASSESSMENT

1. Does the proposed change have an adverse impact on the security assessment of the AP1000. ☐ YES ☒ NO

The change in equipment qualification methodology will not alter barriers or alarms that control access to protected areas of the plant. The change in equipment qualification methodology will not alter requirements for security personnel. Therefore, the change in equipment qualification methodology does not have an adverse impact on the security assessment of the AP1000.

Preparer: Mostafa A. Ahmed Ronald P. Wessel for M. Ahmed Date: 05/09/06
(Print name) (Sign)

Reviewer: Ronald P. Wessel D.A. Lindgren for D.A. Lindgren Date: 05/09/06
(Print name) (Sign)