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Your ref: Project Number 740
Our ref: DCP/NRC2056

December 12, 2007

Subject: AP1000 COL Standard Technical Report Submittal of APP-GW-GLN-144, Revision 0 (TR 144)

In support of Combined License application pre-application activities, Westinghouse is submitting AP1000 Standard Combined License Technical Report Number 144. This report provides Design Control Document (DCD) Tier 1 changes related to the seismic design spectra to provide conformance with previous DCD Tier 2 changes to address hard rock high frequency exceedances. Additional conforming changes to DCD Tier 2 information are also included in the report. This report is submitted as part of the NuStart Bellefonte COL Project (NRC Project Number 740). The information included in this report is generic and is expected to apply to all COL applications referencing the AP1000 Design Certification.

The purpose for submittal of this report was explained in a March 8, 2006 letter from NuStart to the NRC.

Pursuant to 10 CFR 50.30(b), APP-GW-GLN-144, Revision 0, "AP1000 Design Control Document High Frequency Seismic Tier 1 Changes," Technical Report Number 144, is submitted as Enclosure 1 under the attached Oath of Affirmation.

It is expected that when the NRC review of Technical Report Number 144 is complete, the report will be considered approved for all COL applicants referencing the AP1000 Design Certification.

Questions or requests for additional information related to content and preparation of this report 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.

Westinghouse requests the NRC to provide a schedule for review of the technical report within two weeks of its submittal.

D063
D079
NRO

Very truly yours,

A. Sterdis, Manager
Licensing and Customer Interface
Regulatory Affairs and Standardization

/Attachment

1. "Oath of Affirmation," dated December 12, 2007

/Enclosure

1. APP-GW-GLN-144, Revision 0, "AP1000 Design Control Document High Frequency Seismic Tier 1 Changes," Technical Report Number 144

cc:	D. Jaffe	-	U.S. NRC	1E	1A
	E. McKenna	-	U.S. NRC	1E	1A
	G. Curtis	-	TVA	1E	1A
	P. Hastings	-	Duke Power	1E	1A
	C. Ionescu	-	Progress Energy	1E	1A
	A. Monroe	-	SCANA	1E	1A
	J. Wilkinson	-	Florida Power & Light	1E	1A
	C. Pierce	-	Southern Company	1E	1A
	E. Schmiech	-	Westinghouse	1E	1A
	G. Zinke	-	NuStart/Entergy	1E	1A
	R. Grumbir	-	NuStart	1E	1A
	D. Lindgren	-	Westinghouse	1E	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

W. E. Cummins, being duly sworn, states that he is Vice President, Regulatory Affairs and Standardization, 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.

W. E. Cummins
Vice President
Regulatory Affairs and Standardization

Subscribed and sworn to
before me this 12th day
of December 2007.

COMMONWEALTH OF PENNSYLVANIA
Notarial Seal
Patricia S. Aston, Notary Public
Murrysville Boro, Westmoreland County
My Commission Expires July 11, 2011
Member, Pennsylvania Association of Notaries

Notary Public

ENCLOSURE 1

APP-GW-GLN-144, Revision 0

"AP1000 Design Control Document High Frequency Seismic Tier 1 Changes"

Technical Report 144

AP1000 DOCUMENT COVER SHEET

TDC: _____ Permanent File: _____

AP1000 DOCUMENT NO.	REVISION	PAGE	ASSIGNED TO	OPEN ITEMS (Y/N)
APP-GW-GLN-144	0	1 of 33	W-Sterdis	

ALTERNATE DOCUMENT NUMBER: TR-144 WORK BREAKDOWN #:

ORIGINATING ORGANIZATION:

TITLE: **AP1000 Design Control Document High Frequency Seismic Tier 1 Changes**

ATTACHMENTS:	DCP #/REV. INCORPORATED IN THIS DOCUMENT REVISION: None
CALCULATION/ANALYSIS REFERENCE:	

ELECTRONIC FILENAME	ELECTRONIC FILE FORMAT	ELECTRONIC FILE DESCRIPTION
APP-GW-GLN-144-R0.doc	MSWord	

☒ WESTINGHOUSE NON PROPRIETARY CLASS 3

Class 3 Documents being transmitted to the NRC require the following two review signatures in lieu of a Form 36.

LEGAL REVIEW Joseph C. SPADACCINI	SIGNATURE / DATE 12/11/07
PATENT REVIEW Douglas EKCROTH	SIGNATURE / DATE 12/4/07

☐ WESTINGHOUSE PROPRIETARY CLASS 2

ORIGINATOR(S) D. A. Lindgren	SIGNATURE / DATE 12/10/2007	
REVIEWER(S)	SIGNATURE / DATE	
	SIGNATURE / DATE	
	SIGNATURE / DATE	
VERIFIER(S) L. TUNON-SANJUR	SIGNATURE / DATE 12/11/07	Verification Method Independent Review: DETAILED METHOD

**Plant Applicability: ☐ All AP1000 plants except:

☒ Only the following plants: BNG,HAG,LNG,SVO,VSG,WLG

APPLICABILITY REVIEWER** J. A. Speer	SIGNATURE / DATE 12/11/07
RESPONSIBLE MANAGER* A. Sterdis	SIGNATURE / DATE 11 Dec 07

* Approval of the responsible manager signifies that the document and all required reviews are complete, the appropriate proprietary class has been assigned, electronic file has been provided to the EDMS, and the document is released for use.

AP1000 Standard Combined License Technical Report

AP1000 Design Control Document High Frequency Seismic Tier 1 Changes

Westinghouse Electric Company LLC
Nuclear Power Plants
Post Office Box 355
Pittsburgh, PA 15230-0355

Document Number: APP-GW-GLN-144 **Revision Number:** 0

Title: AP1000 Design Control Document High Frequency Seismic Tier 1 Changes

Brief Description of the change (what is being changed and why):
This document provides Design Control Document (DCD) Tier 1 changes related to the seismic design spectra to provide conformance with previous DCD Tier 2 changes to address hard rock high frequency exceedances. Additional conforming changes to DCD tier 2 are also provided.

I. APPLICABILITY DETERMINATION

This evaluation is prepared to document the change described above which includes a change to Tier 1 and a departure from Tier 2 information of the AP1000 Design Control Document (DCD).

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.)

II. TECHNICAL DESCRIPTION AND JUSTIFICATION

The AP1000 is designed using a site-independent U. S. NRC Regulatory Guide 1.60 based design spectrum shape (normalized spectral acceleration as a function of frequency) that has a dominant spectral amplification in the frequency range of 2-10 Hz. The design spectra also know as the Certified Seismic Design Response Spectra (CSDRS) are shown in Figures 3.7.1-1 and 3.7.1-2 of the AP1000 Design Control Document (Reference 1). In contrast, site-specific uniform hazard-based response spectra for Central and Eastern United States (CEUS) hard rock sites have dominant spectral amplification in the greater than 10 Hz frequency range. However, the site-specific CEUS response spectra at hard rock sites contain significantly less displacement and lower response spectra amplification in the frequency range less than 10 Hz and are, consequently, expected to be less damaging to structures, systems, and components (SSCs), than site-independent spectra shapes similar to the Regulatory Guide 1.60 design spectra. CEUS site-specific spectra shapes may contain spectral amplification at frequencies higher than 10 Hz that exceed the spectral amplification contained in the AP1000 design spectrum shape. These high frequency spectral exceedances are considered to cause negligible additional response stresses within typical nuclear plant SSCs, but may be significant to the functional performance of vibration sensitive components, such as relays.

The impact of high frequency spectral exceedances at CEUS sites has been addressed by the NEI Seismic Issues Task Force (SITF) working with EPRI. The finding and conclusions of this task force are documented in the white paper "*Considerations for NPP Equipment and Structures Subjected to Response Levels Caused by High Frequency Ground Motions*" (Reference 2). This white paper was provided to the NRC in an NEI Letter from Adrian Heymer dated March 19, 2007. This white paper was subsequently issued as EPRI Technical Report TR-1015108, *"The Effects of High-Frequency Ground Motion on Structures, Components, and Equipment in Nuclear Power Plants"* (Reference 3). Information from the white paper and report are adapted and excerpted below.

Several utilities developing applications for early site permits (ESPs) and Combined License (COL) applications have attempted to utilize recent guidance to develop site-specific SSE response spectra for CEUS sites. For deep soil sites, the high frequency content of the CEUS bedrock outcrop is attenuated, resulting in surface SSE response spectra similar in shape to the AP1000 design spectra used for certification. For rock and intermediate soil sites, the high frequency content of the CEUS bedrock outcrop is not attenuated, resulting in surface SSE response spectra that have spectral accelerations (for spectral frequencies above about 10 Hz) that are larger than the Regulatory Guide 1.60 design response spectrum accepted for advanced reactor designs. Based on these high frequency ground motion issues, the nuclear power industry developed a number of enhancements to determine site-specific SSE response spectra. These include 1) the use of a CAV filter to remove the effect of low magnitude earthquakes, that have negligible potential for causing damage to nuclear plants, 2) the use of revised CEUS ground motion models in the PSHA calculations, 3) use of a performance goal approach to determine the site-specific performance-based response spectra, and 4) a methodology to account for ground motion incoherence effects in seismic design analyses. These enhancements have improved the definition of high frequency ground motion by taking appropriate consideration of new data and of performance-based seismic design criteria. But these enhancements do not directly address the observation that high frequency motions are essentially non-damaging. For many sites it is still expected that limited high frequency exceedances of design spectra, generated using motions compatible with Regulatory Guide 1.60 ground motion spectra, will occur when the current enhancements are incorporated to determine site-specific motion and the subsequent analyses to determine the response of the plant structures.

High frequency spectral accelerations of interest are those that exceed the CSDRS spectral shape at high frequencies. Nuclear structures (existing plants and the AP1000 design) are very stiff with fundamental frequencies within the range 3-15 Hz. In general, most nuclear structures have fundamental modes less than 10 Hz in the horizontal directions and would not be expected to have significant horizontal response to site-specific spectral shapes that have high spectral accelerations in the frequency range above 10 Hz.

However, these same events produce spectral responses that are significantly lower at the typical fundamental frequencies of nuclear structures than those generated using Regulatory Guide 1.60 spectra. There is substantial empirical evidence that such high frequency excitations are not damaging to power plant and heavy industrial structures and equipment; nor do they cause functional performance anomalies in power plant or heavy industrial equipment systems. In the past, evidence has been found that justifies that additional equipment dynamic qualification effort (testing or analysis) beyond the seismic design bases for operating nuclear power plants (NPPs) to address high frequency response effects is not warranted. In general, it is observed that relative displacement response causes structural damage and that high frequency motions are associated with very low, non-damaging relative displacements.

To validate that the AP1000 design conforms to these observations and expectations, limited analytical evaluations were completed for selected structures and components to confirm the conclusion that structure and component design based on the generic AP1000 design spectra can also withstand the high frequency input typical of a hard rock CEUS site. These evaluations include portions of building structures, primary systems, piping systems, and components evaluated by analysis. The high frequency input does not have a damaging impact on the AP1000 design. These evaluations have been documented in APP-GW-GLR-115 (Reference 4) and incorporated in DCD Appendix 3I with no resulting changes to the design of AP1000 structures, systems and components.

The HRHF GMRS included in the figures provided below for inclusion in Chapter 5 of DCD Tier 1 are modified from the version included in APP-GW-GLR-115 (Reference 4). The spectra in the figures provided below have an increase in amplitude over a portion of the frequency range. The modified spectra bound the site specific spectra for the COL applicants referencing the AP1000 Design Certification with hard rock sites. The use of the figures provided below is supported by the evaluations described in APP-GW-GLR-115. The HRHF GMRS included in these figures are bounded by the response spectra time history used for the evaluations in APP-GW-GLR-115. The same HRHF GMRS are included in revised Figures 3I.1-1 and 3I.1-2

One potential impact of the high frequency input that requires additional consideration is the effect on potentially sensitive active components. The seismic qualification of potentially sensitive active components for the high frequency input typical of a hard rock CEUS site has been addressed by a generic industry program and an AP1000 specific evaluation. The industry program documented in EPRI Technical Report TR-1015109 "*Seismic Screening of Components Sensitive to High Frequency Vibratory Motions*" (Reference 5) discussed (1) identification of high-frequency sensitive or non-ductile equipment and components, (2) establishment of screening criteria, (3) development of evaluation methods, and (4) recommendations for additional testing procedures to address the functional performance of equipment that could be sensitive to high frequency vibration input. The information in this EPRI Technical Report was initially provided to the NRC as EPRI White Paper "*Seismic Screening of Components Sensitive to High Frequency Vibratory Motions*" (Reference 6) in an NEI Letter from Adrian Heymer dated August 30, 2007.

Potentially sensitive active components include devices that have inadvertently changed state, permanently or temporarily (i.e., chattered) or had their output signals affected as a result of vibratory motions: and non-ductile components such as ceramic insulators and cast iron components that have failed due to high frequency shock-type loads. Evaluation and seismic qualification of potentially sensitive active components for high frequency impact for the AP1000 is discussed in APP-GW-GLR-115 (Reference 4) and incorporated in DCD, Revision 16, Appendix 3I. The list of potentially sensitive active components is identified in Appendix 3I as follows:

- Equipment or components with moving parts and required to perform a switching function during the seismic event (e.g., circuit breakers, contactors, auxiliary switches, molded case circuit breakers, motor control center starters, and pneumatic control assemblies)
- Components with moving parts that may bounce or chatter such as relays and actuation devices (e.g., shunt trips)
- Unrestrained components
- Potentiometers

- Process switches and sensors (e.g., pressure/differential pressure, temperature, level, limit/position, and flow)
- Components with accuracy requirements that may drift due to seismic loading
- Interfaces such as secondary contacts
- Connectors and connections (including circuit board connections for digital and analog equipment)

Table A-1 provides a current list of potential high frequency sensitive AP1000 safety-related equipment. These components will be evaluated to determine if testing or analysis is required for high frequency seismic qualification. If vibration testing is required to provide high frequency seismic qualification this testing is independent from the testing for qualification to the Certified Seismic Design Response Spectra. This testing does not require an additional ITAAC. The existing ITAAC addressing equipment qualification cover any such testing required. Information is added to Section 1.2 in Tier 1 to specify that.

III. DCD MARK-UP

Tier 1

Revise the fifth paragraph of Section 1.2 as follows:

Many of the acceptance criteria include the words "A report exists and concludes that..." When these words are used, it indicates that the ITAAC for that design commitment will be met when it is confirmed that appropriate documentation exists and the documentation shows that the design commitment is met. Appropriate documentation can be a single document or a collection of documents that show that the stated acceptance criteria are met. Examples of appropriate documentation include design reports, test reports, inspection reports, analysis reports, evaluation reports, design and manufacturing procedures, certified data sheets, commercial dedication procedures and records, quality assurance records, calculation notes, and equipment qualification data packages. For plants at sites which are qualified using the Hard Rock High Frequency GMRS high frequency seismic testing required as a result of the evaluation of potential high frequency sensitive components is included in the equipment qualification data packages.

Revise 5.0 Site Parameters as follows:

5.0 Site Parameters

Table 5.0-1 identifies the key site parameters that are specified for the design of safety-related aspects of structures, systems, and components for the AP1000. An actual site is acceptable if its site characteristics fall within the AP1000 plant site design parameters in Table 5.0-1.

Structures, systems, and components for the AP1000 are evaluated for generic Ground Motion Response Spectra (GMRS) with high frequency seismic input at a site where the nuclear island is founded on hard rock. The spectra shown in Figure 5.0-3 and Figure 5.0-4 provide hard rock high frequency (HRHF) GMRS at the foundation level for both the horizontal and vertical directions for 5% damping. An actual site is acceptable if its site specific GMRS fall within the AP1000 HRHF parameters in Figures 5.0-3 and 5.0-4. No additional

design or analyses are required for the structures, systems, and components for sites that fall within the AP1000 HRHF parameters.

Revise seismic parameters portion of Table 5.0-1 as follows

Table 5.0-1 (cont.)
Site Parameters

Seismic	
SSE	SSE free field peak ground acceleration of 0.30 g with modified Regulatory Guide 1.60 response spectra (See Figures 5.0-1 and 5.0-2.). Seismic input is defined at finished grade except for sites where the nuclear island is founded on hard rock. The hard rock high frequency (HRHF) ground motion spectra (GMRS) are shown in Figure 5.0-3 and Figure 5.0-4 defined at the foundation level for 5% damping. The HRHF GMRS provide an alternative set of spectra for evaluation of site specific GMRS. A site is acceptable if its site specific GMRS fall within the AP1000 HRHF GMRS.
Fault Displacement Potential	~~None~~Negligible

Add Figures 5.0-3 and 5.0-4 as follows:

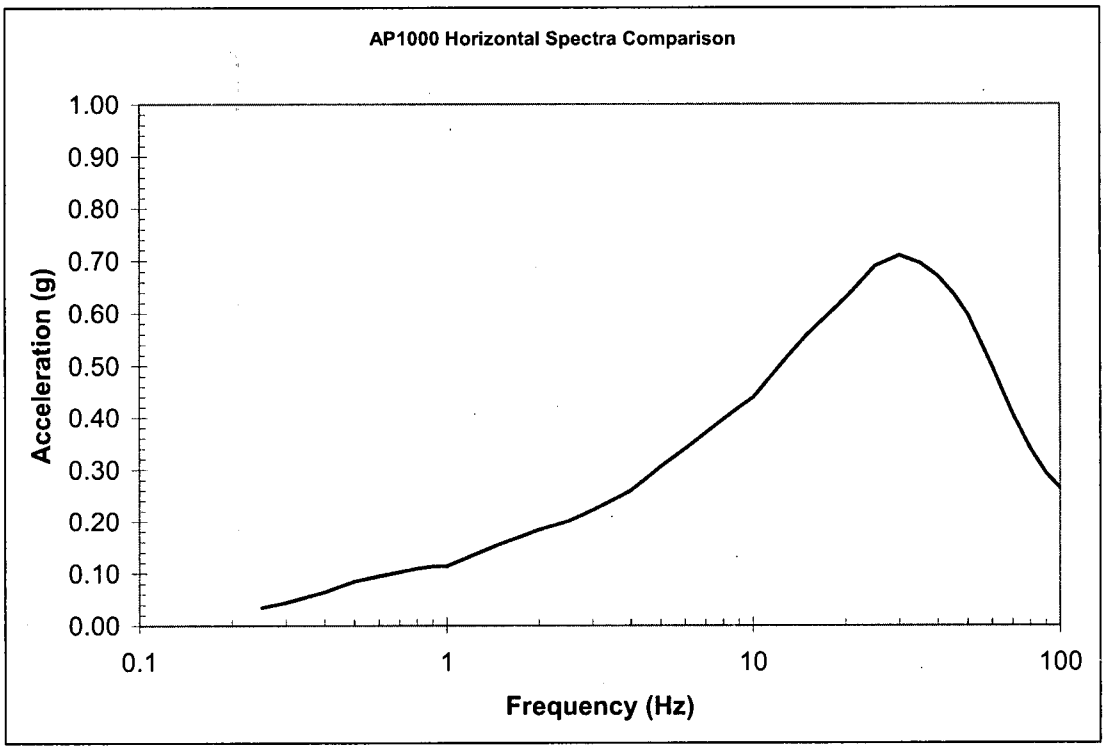

Figure 5.0-3
Horizontal HRHF GMRS
Safe Shutdown Earthquake

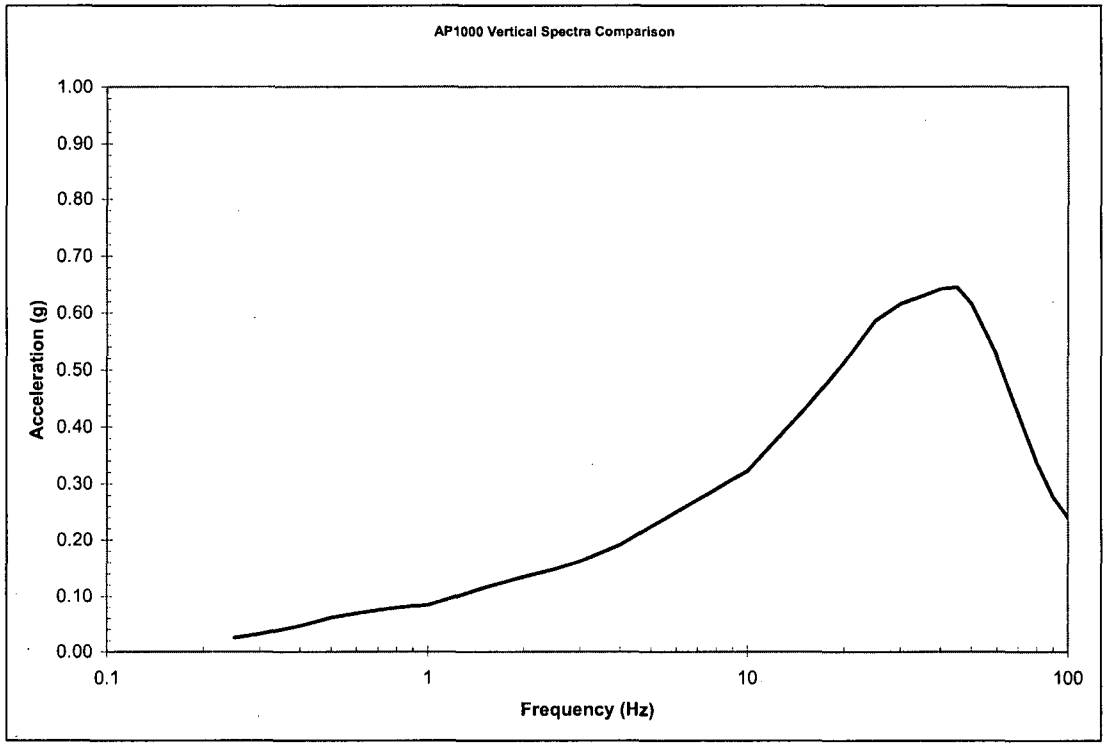

Figure 5.0-4
Vertical HRHF GRMS
Safe Shutdown Earthquake

Tier 2

Revise Table 2-1 by adding a foot note as follows:

Table 2-1 (Sheet 1 of 3)

SITE PARAMETERS

Seismic	
SSE	0.30g peak ground acceleration [c, f]
Fault Displacement Potential	~~None~~Negligible

Notes:

(a) Maximum and minimum safety values are based on historical data and exclude peaks of less than 2 hours duration.
(b) Maximum and minimum normal values are the 1 percent exceedance magnitudes.
(c) With ground response spectra as given in Figures 3.7.1-1 and 3.7.1-2. Seismic input is defined at finished grade except for sites where the nuclear island is founded on hard rock.
(d) The noncoincident wet bulb temperature is applicable to the cooling tower only.
(e) For AP1000, the terms "site boundary" and "exclusion area boundary" are used interchangeably. Thus, the χ/Q specified for the site boundary applies whenever a discussion refers to the exclusion area boundary.
(f) Sites that fall within the hard rock high frequency GMRS given in Figure 3I.1-1 and Figure 3I.1-2 are acceptable.

Add the following paragraph to the end of introductory portion of 3.10.

The AP1000 plant is based on the Certified Seismic Design Response Spectra (CSDRS) defined in subsection 3.7.1.1. The CSDRS are based on Regulatory Guide 1.60 design response spectra with an increase in the 25 hertz region. The Ground Motion Response Spectra (GMRS) for some Central and Eastern United States rock sites show higher amplitude at high frequency than the CSDRS. Evaluations for high frequency exceedance at AP1000 plant rock sites have been performed as described in Appendix 3I. It is the conclusion of these evaluations that AP1000 plant systems, structures, and components are qualified for the high frequency seismic response based on the CSDRS with the exception of potential high frequency sensitive components (APP-GW-GLN-144, Reference 5). Specific models of components are not identified as part of the AP1000 certified design and are evaluated for high frequency sensitivity as part of the equipment qualification. Appendix 3I provides the criteria for addressing potential high frequency sensitive components for plant locations where there is CSDRS exceedance in the high frequency region.

Add the following to 3.10.7 References

5. APP-GW-GLN-144, "AP1000 Design Control Document High Frequency Seismic Tier 1 Changes," Westinghouse Electric Company LLC.

Revise Figure 3I.1-1 as follows:

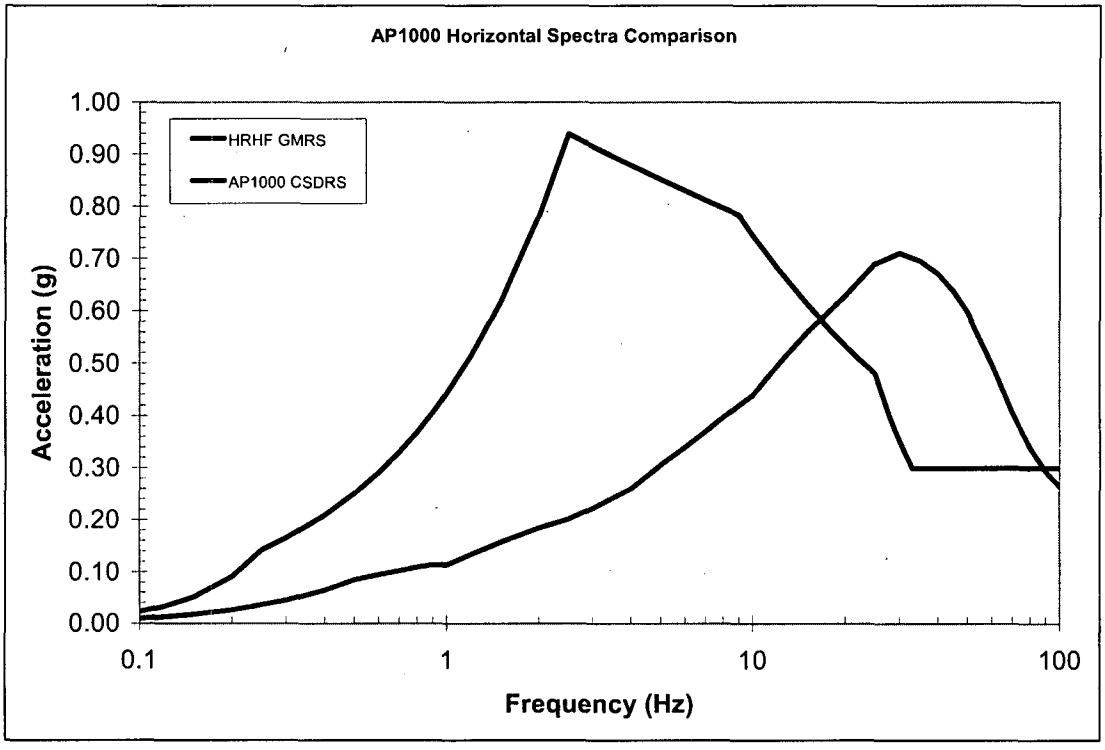

Figure 3I.1-1

Comparison of Horizontal AP1000 CSDRS and HRHF GMRS

Revise Figure 3I.1-2 as follows:

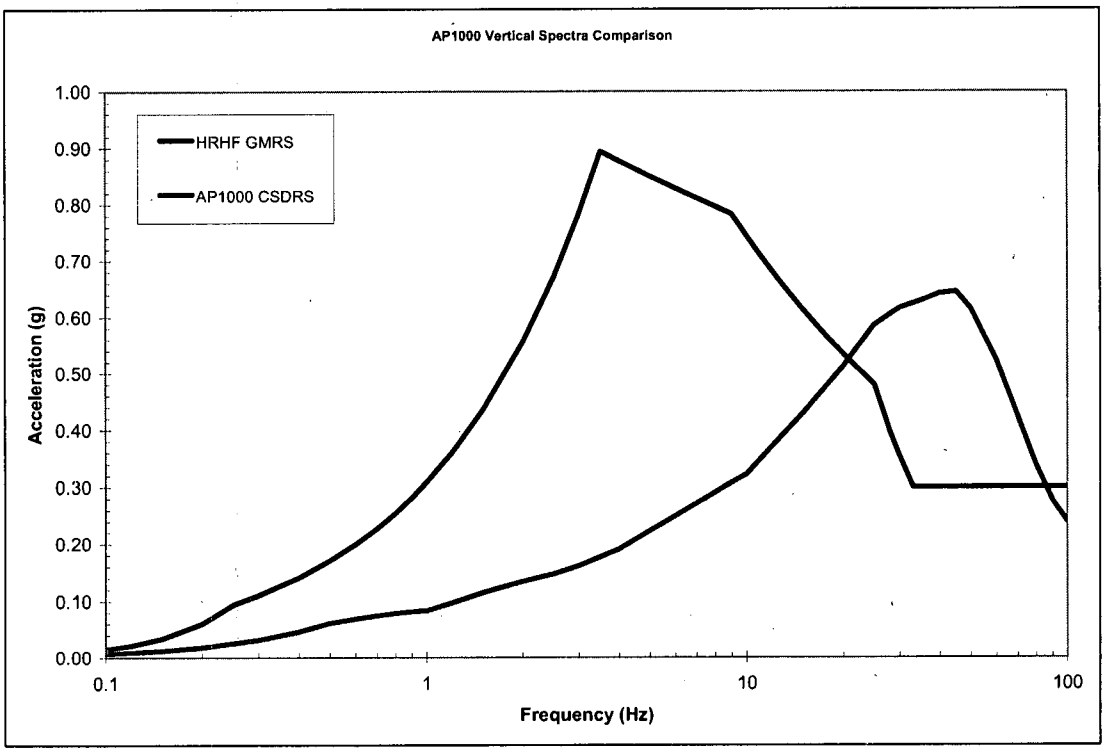

Figure 3I.1-2

Comparison of Vertical AP1000 CSDRS and HRHF GMRS

IV. REGULATORY IMPACT

A. FSER IMPACT

The write-up in FSER section 2.5.2 "Vibratory Ground Motion" is impacted by the addition of the Hard Rock High Frequency spectra. The write-up for FSER Section 3.10 does not address evaluation of potential high frequency sensitive components.

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

   The addition of an alternative high frequency GMRS does not alter the design or design functions of any structure, system, and component. The alternative high frequency GMRS provide an alternative set of site acceptance criteria.

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 addition of an alternative high frequency GMRS does not alter any operating procedures or change how SSC design functions are performed or controlled. These procedures are not based on the criteria used for site acceptance.

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

   The use of alternative seismic acceptance criteria without a change to the design parameters and incorporation of the conclusion of the EPRI White Papers represent a change in the methodology for the seismic evaluation of structures, systems, and components.

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 addition of an alternative high frequency GMRS does not require testing following fuel load. Any qualification testing required to qualify equipment to high frequency vibrations is not a test or experiment in this context.

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

   The use of alternative seismic acceptance criteria does not alter the design function of reactor coolant system or associated systems. The use of alternative seismic acceptance criteria will not affect accident precursors.

2. Does the proposed departure 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

   The use of alternative seismic acceptance criteria does not alter the design function of the reactor coolant system or components and systems relied on to mitigate postulated accident conditions.

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

   The use of alternative seismic acceptance criteria does not alter the response of systems relied on to mitigate postulated accident conditions. Therefore the calculated radioactivity release from a postulated accident condition is not affected.

4. Does the proposed departure 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 use of alternative seismic acceptance criteria does not alter the design functions or response to postulated accident conditions and anticipated transients for the components in the reactor coolant system or associated systems. Therefore the calculated radioactivity release from a malfunction of equipment is not affected.

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

   The use of alternative seismic acceptance criteria does not alter the design functions of the reactor coolant system. The use of alternative seismic acceptance criteria does not add or modify accident precursors.

6. Does the proposed departure 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 use of alternative seismic acceptance criteria does not alter operating conditions or design functions of SSCs important to safety. Therefore there is no new malfunction.

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

The use of alternative seismic acceptance criteria does not alter the pressure boundary integrity design function of the reactor coolant system or other SSCs important to safety.

8. Does the proposed departure 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 seismic evaluation of structures, systems, and components in the AP1000 DCD relies on seismic loads derived from the design spectra in DCD Subsection 3.7.1. The use of alternative seismic acceptance criteria that compares the site specific spectra against the hard rock high frequency spectra relies on the justification in the EPRI White Paper and does not rely on a new evaluation using the hard rock high frequency spectra except for a limited number of examples. This represents a departure from the method of evaluation.

☐ 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 to features that mitigate severe accidents. If the answer is Yes answer Questions 2 and 3 below. ☐ YES ☒ NO

   The use of alternative seismic acceptance criteria does not include changes to the design or design requirements for systems and subsystems used to mitigate severe accidents

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 use of alternative seismic acceptance criteria will not alter barriers or alarms that control access to protected areas of the plant. The use of alternative seismic acceptance criteria will not alter requirements for security personnel.

V REFERENCES

1. AP1000 Design Control Document, Revision 16, May 2007, Westinghouse Electric
2. *Considerations for NPP Equipment and Structures Subjected to Response Levels Caused by High Frequency Ground Motions*, Draft, March 2007, White Paper, Electric Power Research Institute
3. Technical Report TR-1015108, *The Effects of High-Frequency Ground Motion on Structures, Components and Equipment in Nuclear Power Plants,* June 2007, Electric Power Research Institute
4. APP-GW-GLR-115, Effects of High Frequency Seismic Content on SSCs, Revision 0, October 2007, Westinghouse Electric
5. Technical Report TR-1015109, *Seismic Screening of Components Sensitive to High Frequency Vibratory Motions*, October 2007, Electric Power Research Institute
6. *Seismic Screening of Components Sensitive to High Frequency Vibratory Motions,* June 2007, White Paper, Electric Power Research Institute

Table A-1 List of Potential High Frequency Sensitive AP1000 Safety-Related Equipment

The following is a list of potential safety-related equipment which may be high frequency sensitive or have high frequency sensitive components.

Table A-1
List of Potential High Frequency Sensitive AP1000 Safety-Related Equipment

Description	AP1000 Tag No.
BATTERY CHARGERS	
IDSA Battery Charger	IDSA-DC-1
IDSB Battery Charger	IDSB-DC-1
IDSB Battery Charger 2	IDSB-DC-2
IDSC Battery Charger 1	IDSC-DC-1
IDSC Battery Charger 2	IDSC-DC-2
IDSD Battery Charger	IDSD-DC-1
Spare Battery Charger	IDSS-DC-1
DISTRIBUTION PANELS	
IDSA 125 Vdc Dist Panel	IDSA-DD-1
IDSB 125 Vdc Dist Panel	IDSB-DD-1
IDSC 125 Vdc Dist Panel	IDSC-DD-1
IDSD 125 Vdc Dist Panel	IDSD-DD-1
IDSA 120 Vac Dist Panel 1	IDSA-EA-1
IDSA 120 Vac Dist Panel 2	IDSA-EA-2
IDSB 120 Vac Dist Panel 1	IDSB-EA-1
IDSB 120 Vac Dist Panel 2	IDSB-EA-2
IDSB 120 Vac Dist Panel 3	IDSB-EA-3
IDSC 120 Vac Dist Panel 1	IDSC-EA-1
IDSC 120 Vac Dist Panel 2	IDSC-EA-2
IDSC 120 Vac Dist Panel 3	IDSC-EA-3
IDSD 120 Vac Dist Panel 1	IDSD-EA-1
IDSD 120 Vac Dist Panel 2	IDSD-EA-2
FUSE PANELS	
IDSA Fuse Panel	IDSA-EA-4
IDSB Fuse Panel	IDSB-EA-4
IDSB Fuse Panel	IDSB-EA-5
IDSB Fuse Panel	IDSB-EA-6
IDSC Fuse Panel	IDSC-EA-4
IDSC Fuse Panel	IDSC-EA-5
IDSC Fuse Panel	IDSC-EA-6
IDSD Fuse Panel	IDSD-EA-4

Table A-1
List of Potential High Frequency Sensitive AP1000 Safety-Related Equipment

Description	AP1000 Tag No.
TRANSFER SWITCHES	
IDSA Fused Transfer Switch Box 1	IDSA-DF-1
IDSB Fused Transfer Switch Box 1	IDSB-DF-1
IDSB Fused Transfer Switch Box 2	IDSB-DF-2
IDSC Fused Transfer Switch Box 1	IDSC-DF-1
IDSC Fused Transfer Switch Box 2	IDSC-DF-2
IDSD Fused Transfer Switch Box 1	IDSD-DF-1
IDSS Fused Transfer Switch Box 1	IDSS-DF-1
IDSS Spare Termination Box	IDSS-DF-2
IDSS Spare Termination Box	IDSS–DF-3
IDSS Spare Termination Box	IDSS-DF-4
IDSS Spare Termination Box	IDSS-DF-5
IDSS Spare Termination Box	IDSS-DF-6
MOTOR CONTROL CENTERS	
IDSA 125 Vdc MCC	IDSA-DK-1
IDSB 125 Vdc MCC	IDSB-DK-1
IDSC 125 Vdc MCC	IDSC-DK-1
IDSD 125 Vdc MCC	IDSD-DK-1
SWITCHBOARDS	
IDSA 125 Vdc Switchboard 1	IDSA-DS-1
IDSB 125 Vdc Switchboard 1	IDSB-DS-1
IDSB 125 Vdc Switchboard 2	IDSB-DS-2
IDSC 125 Vdc Switchboard 1	IDSC-DS-1
IDSC 125 Vdc Switchboard 2	IDSC-DS-2
IDSD 125 Vdc Switchboard 1	IDSD-DS-1
TRANSFORMERS	
IDSA Regulating Transformer 1	IDSA-DT-1
IDSB Regulating Transformer 1	IDSB-DT-1
IDSC Regulating Transformer 1	IDSC-DT-1
IDSD Regulating Transformer 1	IDSD-DT-1
INVERTERS	
IDSA Inverter	IDSA-DU-1
IDSB Inverter 1	IDSB-DU-1
IDSB Inverter 2	IDSB-DU-2
IDSC Inverter 1	IDSC-DU-1
IDSC Inverter 2	IDSC-DU-2
IDSD Inverter	IDSD-DU-1

Table A-1
List of Potential High Frequency Sensitive AP1000 Safety-Related Equipment

Description	AP1000 Tag No.
SWITCHGEAR	
RCP 1A 6900V Switchgear 31	ECS-ES-31
RCP 1A 6900V Switchgear 32	ECS-ES-32
RCP 2A 6900V Switchgear 51	ECS-ES-51
RCP 2A 6900V Switchgear 52	ECS-ES-52
RCP 1B 6900V Switchgear 41	ECS-ES-41
RCP 1B 6900V Switchgear 42	ECS-ES-42
RCP 2B 6900V Switchgear 61	ECS-ES-61
RCP 2B 6900V Switchgear 62	ECS-ES-62
Reactor Trip Switchgear	PMS-JD-RTSA01
Reactor Trip Switchgear	PMS-JD-RTSA02
Reactor Trip Switchgear	PMS-JD-RTSB01
Reactor Trip Switchgear	PMS-JD-RTSB02
Reactor Trip Switchgear	PMS-JD-RTSC01
Reactor Trip Switchgear	PMS-JD-RTSC02
Reactor Trip Switchgear	PMS-JD-RTSD01
Reactor Trip Switchgear	PMS-JD-RTSD02
LEVEL SWITCHES	
Core Makeup Tank A Narrow Range	PXS-JE-LS011A
Core Makeup Tank A Narrow Range	PXS-JE-LS011B
Core Makeup Tank A Narrow Range	PXS-JE-LS011C
Core Makeup Tank A Narrow Range	PXS-JE-LS011D
Core Makeup Tank B Narrow Range	PXS-JE-LS012A
Core Makeup Tank B Narrow Range	PXS-JE-LS012B
Core Makeup Tank B Narrow Range	PXS-JE-LS012C
Core Makeup Tank B Narrow Range	PXS-JE-LS012D
Core Makeup Tank A Narrow Range	PXS-JE-LS013A
Core Makeup Tank A Narrow Range	PXS-JE-LS013B
Core Makeup Tank A Narrow Range	PXS-JE-LS013C
Core Makeup Tank A Narrow Range	PXS-JE-LS013D
Core Makeup Tank B Narrow Range	PXS-JE-LS014A
Core Makeup Tank B Narrow Range	PXS-JE-LS014B
Core Makeup Tank B Narrow Range	PXS-JE-LS-014C
Core Makeup Tank B Narrow Range	PXS-JE-LS014D
Containment Floodup Level	PXS-JE-LS050
Containment Floodup Level	PXS-JE-LS051
Containment Floodup Level	PXS-JE-LS052

Table A-1
List of Potential High Frequency Sensitive AP1000 Safety-Related Equipment

Description	AP1000 Tag No.
SPEED SENSORS	
RCP 1A Pump Speed	RCS-JE-ST281
RCP 1B Pump Speed	RCS-JE-ST282
RCP 2A Pump Speed	RCS-JE-ST283
RCP 2B Pump Speed	RCS-JE-ST284
TRANSMITTERS	
PCS Water Delivery Flow	PCS-JE-FT001
PCS Water Delivery Flow	PCS-JE-FT002
PCS Water Delivery Flow	PCS-JE-FT003
PCS Water Delivery Flow	PCS-JE-FT004
PCS Storage Tank Water Level	PCS-JE-LT010
PCS Storage Tank Water Level	PCS-JE-LT011
PRHR HX Flow	PXS-JE-FT049A
PRHR HX Flow	PXS-JE-FT049B
RCS Hot Leg 1 Flow	RCS-JE-FT101A
RCS Hot Leg 1 Flow	RCS-JE-FT101B
RCS Hot Leg 1 Flow	RCS-JE-FT101C
RCS Hot Leg 1 Flow	RCS-JE-FT101D
RCS Hot Leg 2 Flow	RCS-JE-FT102A
RCS Hot Leg 2 Flow	RCS-JE-FT102B
RCS Hot Leg 2 Flow	RCS-JE-FT102C
RCS Hot Leg 2 Flow	RCS-JE-FT102D
SG1 Startup Feedwater Flow	SGS-JE-FT055A
SG1 Startup Feedwater Flow	SGS-JE-FT055B
SG2 Startup Feedwater Flow	SGS-JE-FT-056A
SG2 Startup Feedwater Flow	SGS-JE-FT056B
MCR Air Delivery Line Flow Rate – A	VES-JE-FT003A
MCR Air Delivery Line Flow Rate – B	VES-JE-FT003B
Plant Vent Flow	VFS-JE-FT101
IRWST Level	PXS-JE-LT045
IRWST Level	PXS-JE-LT046
IRWST Level	PXS-JE-LT047
IRWST Level	PXS-JE-LT048
RCS Hot Leg Water Level	RCS-JE-LT160A
RCS Hot Leg Water Level	RCS-JE-LT160B
PZR Level	RCS-JE-LT195A
PZR Level	RCS-JE-LT195B
PZR Level	RCS-JE-LT195C

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Table A-1
List of Potential High Frequency Sensitive AP1000 Safety-Related Equipment

Description	AP1000 Tag No.
PZR Level	RCS-JE-LT195D
SG1 Narrow Range Level	SGS-JE-LT001
SG1 Narrow Range Level	SGS-JE-LT002
SG1 Narrow Range Level	SGS-JE-LT003
SG1 Narrow Range Level	SGS-JE-LT004
SG2 Narrow Range Level	SGS-JE-LT005
SG2 Narrow Range Level	SGS-JE-LT006
SG2 Narrow Range Level	SGS-JE-LT007
SG2 Narrow Range Level	SGS-JE-LT008
SG1 Wide Range Level	SGS-JE-LT011
SG1 Wide Range Level	SGS-JE-LT012
SG1 Wide Range Level	SGS-JE-LT015
SG1 Wide Range Level	SGS-JE-LT016
SG2 Wide Range Level	SGS-JE-LT013
SG2 Wide Range Level	SGS-JE-LT014
SG2 Wide Range Level	SGS-JE-LT017
SG2 Wide Range Level	SGS-JE-LT018
Spent Fuel Pool Level	SFS-JE-LT019A
Spent Fuel Pool Level	SFS-JE-LT019B
Spent Fuel Pool Level	SFS-JE-LT019C
Air Storage Tank Pressure – A	VES-JE-PT001A
Air Storage Tank Pressure – B	VES-JE-PT001B
Containment Pressure Normal Range	PCS-JE-PT005
Containment Pressure Normal Range	PCS-JE-PT006
Containment Pressure Normal Range	PCS-JE-PT007
Containment Pressure Normal Range	PCS-JE-PT008
Containment Pressure Extended Range	PCS-JE-PT012
Containment Pressure Extended Range	PCS-JE-PT013
Containment Pressure Extended Range	PCS-JE-PT014
RCS Wide Range Pressure	RCS-JE-PT140A
RCS Wide Range Pressure	RCS-JE-PT140B
RCS Wide Range Pressure	RCS-JE-PT140C
RCS Wide Range Pressure	RCS-JE-PT140D
PZR Pressure	RCS-JE-PT191A
PZR Pressure	RCS-JE-PT191B
PZR Pressure	RCS-JE-PT191C
PZR Pressure	RCS-JE-PT191D
Main Steamline SG1 Pressure	SGS-JE-PT030

Table A-1
List of Potential High Frequency Sensitive AP1000 Safety-Related Equipment

Description	AP1000 Tag No.
Main Steamline SG1 Pressure	SGS-JE-PT031
Main Steamline SG1 Pressure	SGS-JE-PT032
Main Steamline SG1 Pressure	SGS-JE-PT033
Main Steamline SG2 Pressure	SGS-JE-PT034
Main Steamline SG2 Pressure	SGS-JE-PT035
Main Steamline SG2 Pressure	SGS-JE-PT036
Main Steamline SG2 Pressure	SGS-JE-PT037
Main Control Room Differential Pressure	VES-JE-PDT004A
Main Control Room Differential Pressure	VES-JE-PDT004B
PROTECTION AND SAFETY MONITORING SYSTEMS	
Protection and Safety Monitoring System Cabinets	Multiple
QDPS Thermocouple Reference Panel 1	PMS-JW-003B
QDPS Thermocouple Reference Panel 2	PMS-JW-003C
MCR/RSW Transfer Switch Panel A	PMS-JW-004A
MCR/RSW Transfer Switch Panel B	PMS-JW-004B
MCR/RSW Transfer Switch Panel C	PMS-JW-004C
MCR/RSW Transfer Switch Panel D	PMS-JW-004D
Source Range Neutron Flux Preamplifier Panel A	PMS-JW-005A
Source Range Neutron Flux Preamplifier Panel B	PMS-JW-005B
Source Range Neutron Flux Preamplifier Panel C	PMS-JW-005C
Source Range Neutron Flux Preamplifier Panel D	PMS-JW-005D
Intermediate Range Neutron Flux Preamplifier Panel A	PMS-JW-006A
Intermediate Range Neutron Flux Preamplifier Panel B	PMS-JW-006B
Intermediate Range Neutron Flux Preamplifier Panel C	PMS-JW-006C
Intermediate Range Neutron Flux Preamplifier Panel D	PMS-JW-006D
Power Range Neutron Flux High Voltage Distribution Box A	PMS-JW-007A
Power Range Neutron Flux High Voltage Distribution Box B	PMS-JW-007B
Power Range Neutron Flux High Voltage Distribution Box C	PMS-JW-007C
Power Range Neutron Flux High Voltage Distribution Box D	PMS-JW-007D
MAIN CONTROL ROOM	
Operator Workstation A	N/A
Operator Workstation B	N/A
Operator Workstation C	N/A
Supervisor Workstation	N/A
Switch Station(Including Switches)	N/A
QDPS MCR Display Unit	PMS-JY-001B
QDPS MCR Display Unit	PMS-JY-001C
ACTIVE VALVES	

Table A-1
List of Potential High Frequency Sensitive AP1000 Safety-Related Equipment

Description	AP1000 Tag No.
Containment Isolation – Air Out	
Solenoid Valve	CAS-PL-V014-S
Limit Switch	CAS-PL-V014-L
Containment Isolation – Inlet	
Limit Switch	CCS-PL-V200-L
Motor Operator	CCS-PL-V200-M
Containment Isolation – Outlet	
Limit Switch	CCS-PL-V207-L
Motor Operator	CCS-PL-V207-M
Containment Isolation – Outlet	
Limit Switch	CCS-PL-V208-L
Motor Operator	CCS-PL-V208-M
RCS Purification Stop Valve	
Limit Switch	CVS-PL-V001-L
Motor Operator	CVS-PL-V001-M
RCS Purification Stop Valve	
Limit Switch	CVS-PL-V002-L
Motor Operator	CVS-PL-V002-M
RCS Letdown Stop Valve	
Limit Switch	CVS-PL-V003-L
Motor Operator	CVS-PL-V003-M
WLS Letdown IRC Isolation	
Limit Switch	CVS-PL-V045-L
Solenoid Valve	CVS-PL-V045-S1
Letdown Flow ORC Isolation	
Limit Switch	CVS-PL-V047-L
Solenoid Valve	CVS-PL-V047-S1
Auxiliary PZR Spray Isolation	
Limit Switch	CVS-PL-V084-L
Solenoid Valve	CVS-PL-V084-S
Makeup Line Containment Isolation	
Limit Switch	CVS-PL-V090-L
Motor Operator	CVS-PL-V090-M
Makeup Line Containment Isolation	
Limit Switch	CVS-PL-V091-L
Motor Operator	CVS-PL-V091-M
Hydrogen Addition Containment Isolation	
Limit Switch	CVS-PL-V092-L
Solenoid Valve	CVS-PL-V092-S
Demineralizer Water System Isolation	

Table A-1
List of Potential High Frequency Sensitive AP1000 Safety-Related Equipment

Description	AP1000 Tag No.
Limit Switch	CVS-PL-V136A-L
Solenoid Valve	CVS-PL-V136A-S
Demineralized Water System Isolation	
Limit Switch	CVS-PL-V136B-L
Solenoid Valve	CVS-PL-V136B-S
PCCWST Isolation Valve	
Limit Switch	PCS-PL-V001A-L
Solenoid Valve	PCS-PL-V001A-S1
PCCWST Isolation Valve	
Limit Switch	PCS-PL-V001B-L
Solenoid Valve	PCS-PL-V001B-S1
PCCWST Isolation Valve	
Limit Switch	PCS-PL-V001C-L
Motor Operator	PCS-PL-V001C-M
PCCWST Isolation Valve	
Limit Switch	PCS-PL-V002A-L
Motor Operator	PCS-PL-V002A-M
PCCWST Isolation Valve	
Limit Switch	PCS-PL-V002B-L
Motor Operator	PCS-PL-V002B-M
PCCWST Isolation Valve	
Limit Switch	PCS-PL-V002C-L
Motor Operator	PCS-PL-V002C-M
Containment Isolation – Air Sample Line	
Limit Switch	PSS-PL-V008-L
Solenoid Operator	PSS-PL-V008-S
Containment Isolation – Liquid Sample Line	
Limit Switch	PSS-PL-V010A-L
Solenoid Operator	PSS-PL-V010A-S
Containment Isolation – Liquid Sample Line	
Limit Switch	PSS-PL-V010B-L
Solenoid Operator	PSS-PL-V010B-S
Containment Isolation – Liquid Sample Line	
Limit Switch	PSS-PL-V011-L
Solenoid Valve	PSS-PL-V011-S
Containment Isolation - Sample Return Line	
Limit Switch	PSS-PL-V023-L
Solenoid Valve	PSS-PL-V023-S
Containment Isolation - Air Sample Line	
Limit Switch	PSS-PL-V046-L

Table A-1
List of Potential High Frequency Sensitive AP1000 Safety-Related Equipment

Description	AP1000 Tag No.
Solenoid Valve	PSS-PL-V046-S
Core Makeup Tank A Discharge Isolation	
Limit Switch	PXS-PL-V014A-L
Solenoid Valve	PXS-PL-V014A-S1
Core Makeup Tank B Discharge Isolation	
Limit Switch	PXS-PL-V014B-L
Solenoid Valve	PXS-PL-V014B-S1
Core Makeup Tank A Discharge Isolation	
Limit Switch	PXS-PL-V015A-L
Solenoid Valve	PXS-PL-V015A-S1
Core Makeup Tank B Discharge Isolation	
Limit Switch	PXS-PL-V015B-L
Solenoid Valve	PXS-PL-V015B-S1
Nitrogen Supply Outside Containment Isolation	
Limit Switch	PXS-PL-V042-L
Solenoid Valve	PXS-PL-V042-S
PRHR HX Discharge Isolation	
Limit Switch	PXS-PL-V108A-L
Solenoid Valve	PXS-PL-V108A-S1
PRHR HX Discharge Isolation	
Limit Switch	PXS-PL-V108B-L
Solenoid Valve	PXS-PL-V108B-S1
Recirc Sump A Isolation	
Limit Switch	PXS-PL-V117A-L
Motor Operator	PXS-PL–V117A-M
Recirc Sump B Isolation	
Limit Switch	PXS-PL–V117B-L
Motor Operator	PXS-PL-V117B-M
Recirc Sump A Isolation	
Limit Switch	PXS-PL–V118A-L
Squib Operator	PXS-PL–V118A-T
Recirc Sump B Isolation	
Limit Switch	PXS-PL-V118B-L
Squib Operator	PXS-PL-V118B-T
Recirc Sump A	
Limit Switch	PXS-PL-V120A-L
Squib Operator	PXS-PL-V120A-T
Recirc Sump B	PXS- PL-V120B
Limit Switch	PXS-PL-V120B-L

Table A-1
List of Potential High Frequency Sensitive AP1000 Safety-Related Equipment

Description	AP1000 Tag No.
Squib Operator	PXS-PL-V120B-T
IRWST Injection A	
Limit Switch	PXS-PL-V123A-L
Squib Operator	PXS-PL-V123A-T
IRWST Injection B	
Limit Switch	PXS-PL-V123B-L
Squib Operator	PXS-PL-V123B-T
IRWST Injection A	
Limit Switch	PXS-PL-V125A-L
Squib Operator	PXS-PL-V125A-T
IRWST Injection B	
Limit Switch	PXS-PL-V125B-L
Squib Operator	PXS-PL-V125B-T
IRWST Gutter Drain Isolation A	
Limit Switch	PXS-PL-V130A-L
Solenoid Valve	PXS-PL-V130A-S1
IRWST Gutter Drain Isolation B	
Limit Switch	PXS-PL-V130B-L
Solenoid Valve	PXS-PL-V130B-S1
First Stage ADS	
Limit Switch	RCS-PL-V001A-L
Motor Operator	RCS-PL-V001A-M
First Stage ADS	
Limit Switch	RCS-PL-V001B-L
Motor Operator	RCS-PL-V001B-M
Second Stage ADS	
Limit Switch	RCS-PL-V002A-L
Motor Operator	RCS-PL-V002A-M
Second Stage ADS	
Limit Switch	RCS-PL-V002B-L
Motor Operator	RCS-PL-V002B-M
Third Stage ADS	
Limit Switch	RCS-PL-V003A-L
Motor Operator	RCS-PL-V003A-M
Third Stage ADS	
Limit Switch	RCS-PL-V003B-L
Motor Operator	RCS-PL-V003B-M
Fourth Stage ADS	
Limit Switch	RCS-PL-V004A-L
Squib Operator	RCS-PL-V004A-T

Table A-1
List of Potential High Frequency Sensitive AP1000 Safety-Related Equipment

Description	AP1000 Tag No.
Fourth Stage ADS	
Limit Switch	RCS-PL-V004B-L
Squib Operator	RCS-PL-V004B-T
Fourth Stage ADS	
Limit Switch	RCS-PL-V004C-L
Squib Operator	RCS-PL-V004C-T
Fourth Stage ADS	
Limit Switch	RCS-PL-V004D-L
Squib Operator	RCS-PL-V004D-T
First Stage ADS Isolation	
Limit Switch	RCS-PL-V011A-L
Motor Operator	RCS-PL-V011A-M
First Stage ADS Isolation	
Limit Switch	RCS-PL-V011B-L
Motor Operator	RCS-PL-V011B-M
Second Stage ADS Isolation	
Limit Switch	RCS-PL-V012A-L
Motor Operator	RCS-PL-V012A-M
Second Stage ADS Isolation	
Limit Switch	RCS-PL-V012B-L
Motor Operator	RCS-PL-V012B-M
Third Stage ADS Isolation	
Limit Switch	RCS-PL-V013A-L
Motor Operator	RCS-PL-V013A-M
Third Stage ADS Isolation	
Limit Switch	RCS-PL-V013B-L
Motor Operator	RCS-PL-V013B-M
Reactor Vessel Head Vent	
Limit Switch	RCS-PL-V150A-L
Solenoid Operator	RCS-PV-V150A-S
Reactor Vessel Head Vent	
Limit Switch	RCS-PL-V150B-L
Solenoid Operator	RCS-PL-V150B-S
Reactor Vessel Head Vent	
Limit Switch	RCS-PL-V150C-L
Solenoid Operator	RCS-PL-V150C-S
Reactor Vessel Head Vent	
Limit Switch	RCS-PL-V150D-L
Solenoid Operator	RCS-PL-V150D-S

Table A-1
List of Potential High Frequency Sensitive AP1000 Safety-Related Equipment

Description	AP1000 Tag No.
RCS Inner Suction Isolation	
Limit Switch	RNS-PL-V001A-L
Motor Operator	RNS-PL-V001A-M
RCS Inner Suction Isolation	
Limit Switch	RNS-PL-V001B-L
Motor Operator	RNS-PL-V001B-M
RCS Outer Suction Isolation	
Limit Switch	RNS-PL-V002A-L
Motor Operator	RNS-PL-V002A-M
RCS Outer Suction Isolation	
Limit Switch	RNS-PL-V002B-L
Motor Operator	RNS-PL-V002B-M
RHR Control/Isolation Valve	
Limit Switch	RNS-PL-V011-L
Motor Operator	RNS-PL-V011-M
RHR Pump Suction Header Isolation	
Limit Switch	RNS-PL-V022-L
Motor Operator	RNS-PL-V022-M
IRWST Suction Line Isolation	
Limit Switch	RNS-PL-V023-L
Motor Operator	RNS-PL-V023-M
RNS – CVS Containment Isolation	
Limit Switch	RNS-PL-V061-L
Motor Operator	RNS-PL-V061-M
Containment Isolation	
Limit Switch	SFS-PL-V034-L
Motor Operator	SFS-PL–V034-M
Containment Isolation	
Limit Switch	SFS-PL-V035-L
Motor Operator	SFS- PL-V035-M
Containment Isolation	
Limit Switch	SFS-PL-V038-L
Motor Operator	SFS-PL-V038-M
PORV Block Valve	
Limit Switch	SGS-PL-V027A-L
Motor Operator	SGS-PL-V027A-M
PORV Block Valve	
Limit Switch	SGS-PL-V027B-L
Motor Operator	SGS-PL-V027B-M

Table A-1
List of Potential High Frequency Sensitive AP1000 Safety-Related Equipment

Description	AP1000 Tag No.
Steam Safety Valve SG01 Limit Switch	SGS-PL-V030A-L
Steam Safety Valve SG02 Limit Switch	SGS-PL-V030B-L
Steam Safety Valve SG01 Limit Switch	SGS-PL-V031A-L
Steam Safety Valve SG02 Limit Switch	SGS-PL-V031B-L
Steam Safety Valve SG01 Limit Switch	SGS-PL-V032A-L
Steam Safety Valve SG02 Limit Switch	SGS-PL-V032B-L
Steam Safety Valve SG01 Limit Switch	SGS-PL-V033A-L
Steam Safety Valve SG02 Limit Switch	SGS-PL-V033B-L
Steam Safety Valve SG01 Limit Switch	SGS-PL-V034A-L
Steam Safety Valve SG02 Limit Switch	SGS-PL-V034B-L
Steam Safety Valve SG01 Limit Switch	SGS-PL-V035A-L
Steam Safety Valve SG02 Limit Switch	SGS-PL-V035B-L
Steamline Condensate Drain Isolation	
Limit Switch	SGS-PL-V036A-L
Solenoid Valve	SGS-PL-V036A-S
Steamline Condensate Isolation	
Limit Switch	SGS-PL-V036B-L
Solenoid Valve	SGS-PL-V036B-S
Main Steamline Isolation	
Limit Switch	SGS-PL-V040A-L
Solenoid Valve	SGS-PL-V040A-S1
Solenoid Valve	SGS-PL-V040A-S2
Solenoid Valve	SGS-PL-V040A-S3
Solenoid Valve	SGS-PL-V040A-S4
Main Steamline Isolation	
Limit Switch	SGS-PL-V040B-L
Solenoid Valve	SGS-PL-V040B-S1
Solenoid Valve	SGS-PL-V040B-S2
Solenoid Valve	SGS-PL-V040B-S3
Solenoid Valve	SGS-PL-V040B-S4
Main Feedwater Isolation	
Limit Switch	SGS-PL-V057A-L
Solenoid Valve	SGS-PL-V057A-S1
Solenoid Valve	SGS-PL-V057A-S2
Solenoid Valve	SGS-PL-V057A-S3
Solenoid Valve	SGS-PL-V057A-S4
Main Feedwater Isolation	
Limit Switch	SGS-PL-V057B-L
Solenoid Valve	SGS-PL-V057B-S1

Table A-1
List of Potential High Frequency Sensitive AP1000 Safety-Related Equipment

Description	AP1000 Tag No.
Solenoid Valve	SGS-PL-V057B-S2
Solenoid Valve	SGS-PL-V057B-S3
Solenoid Valve	SGS-PL-V057B-S4
Startup Feedwater Isolation	
Limit Switch	SGS-PL-V067A-L
Motor Operator	SGS-PL-V067A-M
Startup Feedwater Isolation	
Limit Switch	SGS-PL-V067B-L
Motor Operator	SGS-PL-V067B-M
SG Blowdown Isolation	
Limit Switch	SGS-PL-V074A-L
Solenoid Valve	SGS-PL-V074A-S
SG Blowdown Isolation	
Limit Switch	SGS-PL-V074B-L
Solenoid Valve	SGS-PL-V074B-S
SG Series Blowdown Isolation	
Limit Switch	SGS-PL-V075A-L
Solenoid Valve	SGS-PL-V075A-S
SG Series Blowdown Isolation	
Limit Switch	SGS-PL-V075B-L
Solenoid Valve	SGS-PL-V075B-S
Steamline Condensate Drain Isolation Solenoid Valve	SGS-PL-V086A-S
Steamline Condensate Drain Isolation Solenoid Valve	SGS-PL-V086B-S
Power Operated Relief Valve	
Limit Switch	SGS-PL-V233A-L
Solenoid Valve	SGS-PL-V233A-S
Power Operated Relief Valve	
Limit Switch	SGS-PL-V233B-L
Solenoid Valve	SGS-PL-V233B-S
MSIV Bypass Isolation Valve	
Limit Switch	SGS- PL-V240A-L
Solenoid Valve	SGS-PL-V240A-S1
Solenoid Valve	SGS-PL-V240A-S2
MSIV Bypass Isolation Valve	
Limit Switch	SGS-PL-V240B-L
Solenoid Valve	SGS-PL-V240B-S1
Solenoid Valve	SGS-PL-V240B-S2
Main Feedwater Control Valve	
Limit Switch	SGS-PL-V250A-L

Table A-1
List of Potential High Frequency Sensitive AP1000 Safety-Related Equipment

Description	AP1000 Tag No.
Solenoid Valve	SGS-PL-V250A-S
Main Feedwater Control Valve	
Limit Switch	SGS-PL-V250B-L
Solenoid Valve	SGS-PL-V250B-S
Startup Feedwater Control Valve	
Limit Switch	SGS-PL-V255A-L
Solenoid Valve	SGS-PL-V255A-S
Startup Feedwater Control Valve	
Limit Switch	SGS-PL-V255B-L
Solenoid Valve	SGS-PL-V255B-S
MCR Isolation Valve	
Limit Switch	VBS-PL-V186-L
Solenoid Valve	VBS-PL-V186-S
MCR Isolation Valve	
Limit Switch	VBS-PL-V187-L
Solenoid Valve	VBS-PL-V187-S
MCR Isolation Valve	
Limit Switch	VBS-PL-V188-L
Solenoid Valve	VBS-PL-V188-S
MCR Isolation Valve	
Limit Switch	VBS-PL-V189-L
Solenoid Valve	VBS-PL-V189-S
MCR Isolation Valve	
Limit Switch	VBS-PL-V190-L
Solenoid Valve	VBS-PL-V190-S
MCR Isolation Valve	
Limit Switch	VBS-PL-V191-L
Solenoid Valve	VBS-PL-V191-S
Actuation Valve A	
Limit Switch	VES-PL-V005A-L
Solenoid Operator	VES-PL-V005A-S
Actuation Valve B	
Limit Switch	VES-PL-V005B-L
Solenoid Operator	VES-PL-V005B-S
Relief Isolation Valve A	
Limit Switch	VES-PL-V022A-L
Solenoid Valve	VES-PL-V022A-S
Relief Isolation Valve B	
Limit Switch	VES-PL-V022B-L

Table A-1
List of Potential High Frequency Sensitive AP1000 Safety-Related Equipment

Description	AP1000 Tag No.
Solenoid Valve	VES-PL-V022B-S
Containment Purge Inlet Isolation	
Limit Switch	VFS-PL-V003-L
Solenoid Valve	VFS-PL-V003-S1
Containment Purge Inlet Isolation	
Limit Switch	VFS-PL-V004-L
Solenoid Valve	VFS-PL-V004-S1
Containment Purge Discharge Isolation	
Limit Switch	VFS-PL-V009-L
Solenoid Valve	VFS-PL-V009-S1
Containment Purge Discharge Isolation	
Limit Switch	VFS-PL-V010-L
Solenoid Valve	VFS-PL-V010-S1
Fan Cooler Supply Isolation	
Limit Switch	VWS-PL-V058-L
Solenoid Valve	VWS-PL-V058-S
Fan Cooler Return Isolation	
Limit Switch	VWS-PL-V082-L
Solenoid Valve	VWS-PL-V082-S
Fan Cooler Return Isolation	
Limit Switch	VWS-PL-V086-L
Solenoid Valve	VWS-PL-V086-S
Sump Containment Isolation IRC	
Limit Switch	WLS-PL-V055-L
Solenoid Valve	WLS-PL-V055-S1
Sump Containment Isolation ORC	
Limit Switch	WLS-PL-V057-L
Solenoid Valve	WLS-PL-V057-S1
RCDT Gas Containment Isolation	
Limit Switch	WLS-PL-V067-L
Solenoid Valve	WLS-PL-V067-S
RCDT Gas Containment Isolation	
Limit Switch	WLS-PL-V068-L
Solenoid Valve	WLS-PL-V068-S
Core Makeup Tank A CL Inlet Isolation	
Limit Switch	PXS-PL-V002A-L
Motor Operator	PXS-PL-V002A-M
Core Makeup Tank B CL Inlet Isolation	
Limit Switch	PXS-PL-V002B-L
Motor Operator	PXS-PL-V002B-M

Table A-1
List of Potential High Frequency Sensitive AP1000 Safety-Related Equipment

Description	AP1000 Tag No.
PRHR HX Inlet Isolation	
Limit Switch	PXS-PL-V101-L
Motor Operator	PXS-PL-V101-M
Fourth Stage ADS Isolation	
Limit Switch	RCS-PL-V014A-L
Motor Operator	RCS-PL-V014A-M
Fourth Stage ADS Isolation	
Limit Switch	RCS-PL-V014B-L
Motor Operator	RCS-PL-V014B-M
Fourth Stage ADS Isolation	
Limit Switch	RCS-PL-V014C-L
Motor Operator	RCS-PL-V014C-M
Fourth Stage ADS Isolation	
Limit Switch	RCS-PL-V014D-L
Motor Operator	RCS-PL-V014D-M