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Your ref: Project Number 740
Our ref: DCP/NRC1883

May 11, 2007

Subject: AP1000 COL Standard Technical Report Submittal of APP-GW-GLN-110, Revision 0

In support of Combined License application pre-application activities, Westinghouse is submitting Revision 0 of AP1000 Standard Combined License Technical Report Number 110. This report identifies and justifies standard changes to DCD Section 3.2, 3.11, and Appendix 3D in the AP1000 Design Control Document. Changes to the Design Control Document identified in Technical Report Number 110 are intended to be incorporated into FSARs referencing the AP1000 design certification or incorporated into the design certification using supplemental rulemaking when Part 52 is revised to permit revision of the design certification. 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-110, Revision 0, "Changes to AP1000 Design Control Document (DCD) Chapter 3.11 – Environmental Qualification of Mechanical and Electrical Equipment and Chapter 3 Appendix 3D – Methodology for Qualifying AP1000 Safety Related Electrical and Mechanical Equipment," Technical Report Number 110, is submitted as Enclosure 1 under the attached Oath of Affirmation.

It is expected that when the NRC review of Technical Report Number 110 is complete, the changes to the AP1000 DCD identified in Technical Report 110 will be considered approved generically for 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.

D079

Very truly yours,

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

/Attachment

1. "Oath of Affirmation," dated May 11, 2007

/Enclosure

1. APP-GW-GLN-110, Revision 0 "Changes to AP1000 Design Control Document (DCD) Chapter 3.11 – Environmental Qualification of Mechanical and Electrical Equipment and Chapter 3 Appendix 3D – Methodology for Qualifying AP1000 Safety Related Electrical and Mechanical Equipment," Technical Report Number 110

cc:	S. Bloom	-	U.S. NRC	1E	1A
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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 & 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 & Standardization

Subscribed and sworn to
before me this 11th day
of May 2007.

COMMONWEALTH OF PENNSYLVANIA
Notarial Seal
Debra McCarthy, Notary Public
Monroeville Boro, Allegheny County
My Commission Expires Aug. 31, 2009
Member, Pennsylvania Association of Notaries

Debra McCarthy
Notary

ENCLOSURE 1

APP-GW-GLN-110, Revision 0

"Changes to AP1000 Design Control Document (DCD) Chapter 3.11 – Environmental Qualification of Mechanical and Electrical Equipment and Chapter 3 Appendix 3D – Methodology for Qualifying AP1000 Safety Related Electrical and Mechanical Equipment,"

Technical Report 110

AP1000 DOCUMENT COVER SHEET

TDC: _____ Permanent File: _____ APY: _____

RFS#: _____ RFS ITEM #: _____

AP1000 DOCUMENT NO.	REVISION NO.		ASSIGNED TO
APP-GW-GLN-110	0	Page 1 of 119	W-Sterdis

ALTERNATE DOCUMENT NUMBER: TR110 WORK BREAKDOWN #:

ORIGINATING ORGANIZATION: NS-EMPE

TITLE: **Changes to AP1000 Design Control Document (DCD) Chapter 3.11 – Environmental Qualification of Mechanical and Electrical Equipment and Chapter 3 Appendix 3D – Methodology for Qualifying AP1000 Safety Related Electrical and Mechanical Equipment**

ATTACHMENTS:	DCP #/REV. INCORPORATED IN THIS DOCUMENT REVISION:
None	APP-GW-GEE-009 R1, -039 R1, -053 R1, -054 R0, -098 R0, -171 R0, -0172 R1, -188 R1, -224 R1; GW-GEE-338 R0, -385 R2, -439 R0
CALCULATION/ANALYSIS REFERENCE: None	

ELECTRONIC FILENAME	ELECTRONIC FILE FORMAT	ELECTRONIC FILE DESCRIPTION
APP-GW-GLN-110 RA	Microsoft Word	Text

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LEGAL REVIEW ~~E. L. White~~ Eric S. Gillen	SIGNATURE/DATE Eric S. Gillen 5-3-07
PATENT REVIEW M. M. Corletti	SIGNATURE/DATE M. M. Corletti 4-30-07

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ORIGINATOR Ronald P. Wessel	SIGNATURE/DATE Ronald P Wessel 4/30/07	
REVIEWERS Mostafa Ahmed	SIGNATURE/DATE Mostafa A. Ahmed 4/30/07	
VERIFIER Edward W. Drake	SIGNATURE/DATE Edward W. Drake 4/30/07	VERIFICATION METHOD Page by Page
AP1000 RESPONSIBLE MANAGER Dan C. Frederick	SIGNATURE* Dan C. Frederick	APPROVAL DATE 5/1/07

* 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.

APP-GW-GLN-110
Revision 0

April 2007

AP1000 Standard Combined License Technical Report

Title: Changes to AP1000 Design Control Document (DCD) Chapter 3.11 – Environmental Qualification of Mechanical and Electrical Equipment and Chapter 3 Appendix 3D – Methodology for Qualifying AP1000 Safety Related Electrical and Mechanical Equipment

Westinghouse Electric Company LLC
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Document Number: APP-GW-GLN-110 **Revision Number:** 0

Title: Changes to AP1000 Design Control Document (DCD) Chapter 3.11 – Environmental Qualification of Mechanical and Electrical Equipment and Chapter 3 Appendix 3D – Methodology for Qualifying AP1000 Safety Related Electrical and Mechanical Equipment

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

This report summarizes changes to Chapter 3 Sections 3.2, 3.11 and Appendix 3D of the APP-GW-G1-700, AP1000 Design Control Document (DCD) (Reference 1). The changes to these sections are the result of editorial changes, clarifications, design changes and plant parameter re-evaluations that reflect the current AP1000 design. The information provided in this document is expected to be standard for all AP1000 plants; therefore, providing this information will allow the NRC to review it once for licensing purposes.

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) 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 3 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 in a COL application 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

Document Number: APP-GW-GLN-110 **Revision Number:** 0
Title: Changes to AP1000 Design Control Document (DCD) Chapter 3.11 – Environmental Qualification of Mechanical and Electrical Equipment and Chapter 3 Appendix 3D – Methodology for Qualifying AP1000 Safety Related Electrical and Mechanical Equipment

II. TECHNICAL DESCRIPTION AND JUSTIFICATION

This report details the changes made to Chapter 3 Sections 3.2 (Table 3.2-3), 3.11 and Appendix 3D of the DCD. This section describes the changes and provides the justification for the changes. In general, the changes are:

- Editorial and typographic changes
- Clarifications to better describe the subject matter
- Plant design change packages that have been reviewed and approved by the Change Control Board and reflect the current plant design

The changes are presented as the sections appear in the DCD.

Additional changes for Chapter 3 Appendix 3D are contained in APP-GW-GLN-006, Revision 2 (TR62) (Reference 2). The Appendix 3D changes presented in APP-GW-GLN-006 are related to seismic qualification methodology associated with DCD Chapter 3 Section 3.10.

Details of the Changes:

Chapter 3 Section 3.2:
Change 3.2-1: Table 3.2-3:

Table 3.2-3 has been updated to reflect the current AP1000 design and to correct typographic errors. The mark-up table is shown in Section III of this report.

The DCD mark-up of the affected pages is shown on pages 9 through 22 of this report.

Chapter 3 Section 3.11:
Change 3.11-1: Sections 3.11.1.1, 3.11.5:

The maintenance of the equipment qualification file is identified as COL Information Item 3.11-1 in APP-GW-GL-700, AP1000 Design Control Document (DCD) (Reference 1), Section 3.11.5 of the DCD is to be completed by the Combined License applicant.

The COL item from the DCD reads:

> "Combined License applicant is responsible for the maintenance of the equipment qualification file during the equipment selection and procurement phase."

Westinghouse Electric Company LLC will act as the agent for the COL holder during the equipment design phase, equipment selection and procurement phase, equipment qualification phase, plant construction phase and ITAAC inspection phase.

Westinghouse will turn over the equipment qualification files prior to fuel load. The COL holder will define the process and procedures for which the equipment qualification files will be accepted from Westinghouse and how the files will be retained and maintained in a auditable format for the period that the equipment is installed and/or stored for future use in the nuclear power plant.

Section 3.11.5 is revised to relect the position described above. In addition, Section 3.11.1.1 of Section 3.11 currently includes the following statement: "The Combined License applicant is responsible for verification that the equipment qualification file is maintained during the equipment selection and procurement phase." This sentence is revised to direct the DCD reader to Section 3.11.5 for information regarding the equipment qualification files.

The DCD mark-up of the affected pages is shown on pages 23, 25 and 26 of this report.

Change 3.11-2: Sections 3.11.1.2.:

An editorial change has been made to this section in paragraph 6 to correct the table reference. In addition, reference to the Combined License applicant in the paragraph 9 has been deleted. The qualified life will addressed in the environmental qualification programs.

The DCD mark-up of the affected pages is shown on pages 23-24 of this report.

Change 3.11-3: Sections 3.11.2.1, 3.11.6:

An editorial change has been made to this section. This section refers to environmental qualification (IEEE 323-1974). Reference to IEEE 344-1987 (Seismic) is not required and therefore removed from this section and from Section 3.11.6 References.

The DCD mark-up of the affected pages is shown on pages 25-26 of this report.

Change 3.11-4: Table 3.11-1:

Table 3.11-1 has been updated to address the following items:

- The current AP1000 plant design
- Clarification of components that require harsh and radiation harsh qualification
- Editorial and typographic changes

The DCD mark-up of the affected pages is shown on pages 27 through 73 of this report.

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Title: Changes to AP1000 Design Control Document (DCD) Chapter 3.11 – Environmental Qualification of Mechanical and Electrical Equipment and Chapter 3 Appendix 3D – Methodology for Qualifying AP1000 Safety Related Electrical and Mechanical Equipment

Chapter 3 Appendix 3D:

Change 3D-1: Sections 3D, 3D.1, 3D.4.2, 3D.4.4, 3D.5.2.1, 3D.6, Table 3D.4.2, Table 3D.C-1, Attachment D.2:

Editorial clarifications and typographic changes have been made to these sections. These changes are summarized below.

Chapter 3 Appendix 3D Editorial Changes		
Section	**Paragraph**	**Comment**
3D	7	Changed "and" to "or" as shown in DCD mark-up on page 75
3D.1	4	Correct title of IEEE 344-1987 as shown in DCD mark-up on page 75
3D.4.2	1	Correct title of IEEE 100 as shown in DCD mark-up on page 78
3D.4.4	1	Changed "subsequence" to "subsequent" as shown in DCD mark-up on page 78
3D.5.2.1	3	Changed "240°F" to "250°F" as shown in DCD mark-up on page 80
3D.6	2	Correct Section Number for Analysis and Experience as shown in DCD mark-up on page 84
Table 3D.4-2	1st Row	Correct typographic error as shown in DCD mark-up on page 86
Table 3D.C-1 (Sheet 2)	5th Row	Added value to table for Aromatic Amide-Imide as shown in DCD mark-up on page 112
Attachment D.2	-	Corrected typographic errors in the Boltzmann's constant and the Arrhenius equations as shown in DCD mark-up on pages 113-114

Change 3D-2: Section 3D.4.1.2, Chapter 1 Appendix 1A:

Editorial change has been made in the second paragraph to remove the information in regard to Section 3D.6.3. This section does not refer to Regulatory Guide 1.33.

Also, Regulatory Guide 1.97 has been added to Section 3D.4.1.2, "NRC Regulatory Guides." AP1000 conformance to this Regulatory Guide is define in the DCD Section 1.9, Chapter 1 Appendix 1A and Section 7.5.1. This Regulatory Guide also provides the required qualification criteria for the post accident monitoring instruments.

Appendix 1A of Chapter 1 of the DCD states the Regulatory Guide 1.33 is not applicable for the AP1000 design certification. In Appendix 3D.4.1.2, paragraph 2, Regulatory Guide 1.33 is used in a specific manner for determining documentation adequacy in regard to the on-going qualification method described in Appendix 3D.6.4. The referencing of Regulatory Guide 1.33 in Appendix 3D does not mean that Westinghouse has developed a position on the general application of the criteria contained in the guide. The development of that conformance position remains the responsibility of the COL applicants. Chapter 1, Appendix 1A is revised to add clarification of the specific use of Regulatory Guide 1.33 for any on-going qualification program.

The DCD mark-up of the affected pages is shown on pages 76-78 and 115 of this report.

Change 3D-3: Sections 3D.5.5.1.5, 3D.5.5.2, Figure 3D.5-9:

Changes to Sections 3D.5.5.1.5, 3D.5.5.2 and Figure 3D.5-9 have been developed based on a re-evaluation of the Main Steam Isolation Valve (MSIV) Compartment. The original evaluation of the temperature response to a main steam line break outside containment used a mass and energy release that have been updated.

The original evaluation also evaluated breaks up to 2.8ft^2. The standard review plan (NUREG-0800) allows break exclusion zones (such as the MSIV compartment) to have limiting breaks of 1.0ft^2.

This change results in changes to Figure 3D.5-9 and the addition of Figure 3D.5-9 Sheet 2 that displays the long term return to normal temperature in the MSIV compartments. For consistency the EQ envelopes have been removed from Figures 3D.5-8 (Sheets 1 and 2) (see Change 3D-7), and to show the responses to the different accidents. This change has been noted in the text section 3D.5.5.1.5 of the DCD mark-ups. The required IEEE 323-1974 margins shall be added for temperature and pressure in the environmental qualification programs.

The DCD mark-up of the affected pages is shown on pages 83-85 and 109-111 of this report.

Change 3D-4: Sections 3D.5.5.1.1, 3D.5.5.1.2, 3D.5.5.1.4, 3D.8, Figures 3D.5-2through 3D.5-5:

The radiation dose information that is currently in the AP1000 DCD relative to Equipment Qualification (EQ) was recently reviewed and updated based on the consideration of (passive) airborne radioactivity removal processes. Credit for such removal mechanisms is noted to be in accordance with Regulatory Guide 1.183. The sections have been revised to reflect the re-evaluation and provide clarity to the subject matter.

The DCD mark-up of the affected pages is shown on pages 81-83, 85, 97-104 of this report.

Change 3D-5: Table 3D.5-1 (Sheets 1, 2 and 3):

Table 3D.5-1 in Appendix 3D of the DCD lists the normal operating environments in AP1000 by assigning rooms to different environmental zones. The table has been updated to reflect the current AP1000 plant design.

The DCD mark-up of the affected pages is shown on pages 87-89 of this report.

Change 3D-6: Table 3D.5-4, Figure 3D.5-1:

Three figures (Figure 3D.5-1 Sheets 1, 2 and 3) that outline testing envelope for the Main Control Room, DC Equipment Rooms, and I&C Rooms have been revised. This section indicates that the maximum relative humidity these components should be subject to is 95%. This section also indicates that the maximum temperature these equipment should be subject to is 120°F with a maximum wet bulb temperature of 95°F. These figures simply incorporated a testing envelope of 120°F with a relative humidity of 95%. By observing a psychometric chart, a dry bulb temperature of 120°F and wet bulb temperature of 95°F yields a maximum relative humidity of approximately 40% which is much lower than the indicated testing of 95% relative humidity. Additionally in the DC equipment and I&C rooms there is no additional source of moisture. The

main control room, however, does have additional sources of moisture that include the respiration of the personnel in the room. A calculation was done that indicates even while considering the maximum number of occupants in the MCR the relative humidity remains under 50% at the indicated 120°F. The new Figures 3D.5-1 Sheets 1 and 2 remove the indicated humidity that accompanies these temperatures and replace them with humidity that is more realistic. After 72 hours procedure dicates that outside air is drawn into these rooms. The figures have been revised to reflect the two bounding curves after 72 hours. The lower curve bounds the high humidity condition and the upper curve bounds high temperature condition. Notes 2 and 3 have been revised in Table 3D.5-4 to further clarify this change. Please note that the DCD figures 3D.5-1 Sheets 2 and 3 will now become one figure because they follow the same temperature curve.

The DCD mark-up of the affected pages is shown on pages 91-96 of this report.

Change 3D-7: Figure 3D.5-8:

Figure 3D.5-8 has been revised to remove the EQ Curve and show only the design Design Basis Accident (DBA) conditions. The new figures do not include the IEEE 323-1974 margins which will be included in the equipment qualification programs.

The DCD mark-up of the affected pages is shown on pages 105-108 of this report.

References:

1. APP-GW-GL-700, "AP1000 Design Control Document," Revision 15 (Non Proprietary).

2. APP-GW-GLN-006, "Methodology for Qualifying AP1000 Safety-Related Electrical and Mechanical Equipment," Revision 2, April 2007.

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III. DCD MARK-UP

Tier 2

Change 3.2-1: DCD Chapter 3 Section 3.2 – Table 3.2-3 Changes:

Table 3.2-3 (Sheet 1 of 65)

AP1000 CLASSIFICATION OF MECHANICAL AND FLUID SYSTEMS, COMPONENTS, AND EQUIPMENT

Tag Number	Description	AP1000 Class	Seismic Category	Principal Construction Code	Comments
Auxiliary Steam Supply System (ASS)					Location: Turbine Building
System components are Class E					
Steam Generator Blowdown System (BDS)					Location: Turbine Building
System components are Class E					
Compressed and Instrument Air System (CAS)					Location: Various
CAS-PL-V014	Instrument Air Supply Outside Containment Isolation	B	I	ASME III-2	
CAS-PL-V015	Instrument Air Supply Inside Containment Isolation	B	I	ASME III-2	
CAS-PL-V027	Containment Penetration Test Connection Isolation	B	I	ASME III-2	
CAS-PL-V065	H2/Zinc Additon – IRC Shutoff	C	I	ASME III-3	
CAS-PL-V095	H2/Zinc Additon – Cont Isol Test Conn	C	I	ASME III-3	
CAS-PL-V204	Service Air Supply Outside Containment Isolation	B	I	ASME III-2	
CAS-PL-V205	Service Air Supply Inside Containment Isolation	B	I	ASME III-2	
CAS-PL-V219	Containment Penetration Test Connection Isolation	B	I	ASME III-2	
CAS-PY-C02	Containment Instrument Air Inlet Penetration	B	I	ASME III, MC	
CAS-PY-C03	Containment Service Air Inlet Penetration	B	I	ASME III, MC	
Balance of system components are Class E					
Component Cooling Water System (CCS)					Location: Auxiliary Building and Turbine Building
n/a	Heat Exchangers, CCS and SWS Side	D	NS	ASME VIII	

Table 3.2-3 (Sheet 1 of 65)

AP1000 CLASSIFICATION OF MECHANICAL AND FLUID SYSTEMS, COMPONENTS, AND EQUIPMENT

Tag Number	Description	AP1000 Class	Seismic Category	Principal Construction Code	Comments
n/a	Pumps	D	NS	Hydraulic Institute Stds.	
n/a	Tanks	D	NS	ASME VIII	
n/a	Valves Providing CCS AP1000 Equipment Class D Function	D	NS	ANSI 16.34	
CCS-PL-V200	CCS Containment Isolation Valve - Inlet Line ORC	B	I	ASME III-2	
CCS-PL-V201	CCS Containment Isolation Valve - Inlet Line IRC	B	I	ASME III-2	

Table 3.2-3 (Sheet 6 of 65)

AP1000 CLASSIFICATION OF MECHANICAL AND FLUID SYSTEMS, COMPONENTS, AND EQUIPMENT

Tag Number	Description	AP1000 Class	Seismic Category	Principal Construction Code	Comments
Fuel Handling and Refueling System (Continued)					
FHS-MT-05	Spent Fuel Cask Loading Pit	C	I	ACI 349	ACI 349 Evaluation of Structural Boundary Only
FHS-MT-06	Spent Fuel Cask Washdown Pit	C	I	ACI 349	ACI 349 Evaluation of Structural Boundary Only
FHS-MY-Y01	Spent Fuel Transfer Gate	C	I	Manufacturer Std.	
FHS-MY-Y02	Spent Fuel Cask Loading Pit Gate	C	I	Manufacturer Std.	
FHS-PL-V001	Fuel transfer tube Isolation Valve	C	I	ASME-III-3	
FHS-PY-B01	Fuel Transfer Tube Blind Flange	B	I	ASME III-2	
Balance of system components are Class E					
Fire Protection System (FPS)					Location: Various
FPS-PL-V049	Fire Water Containment Test Conn Isol	B	I	ASME III-2	
FPS-PL-V050	Fire Water Containment Supply Isolation	B	I	ASME III-2	
FPS-PL-V051	Fire Water Containment Test Connection Isolation	B	I	ASME III-2	
FPS-PL-V052	Fire Water Containment Supply Isolation - Inside	B	I	ASME III-2	
FPS-PY-C01	Fire Protection Containment Penetration	B	I	ASME III, MC	
Balance of system components are Class E					
Main and Startup Feedwater System (FWS)					Location: Turbine Building
n/a	Startup Feedwater Pumps	D	NS	Hydraulic Institute Standards	
n/a	Valves Providing SFW AP1000 Equipment Class D Function	D	NS	ANSI 16.34	
Balance of system components are Class E					

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Table 3.2-3 (Sheet 7 of 65)

AP1000 CLASSIFICATION OF MECHANICAL AND FLUID SYSTEMS, COMPONENTS, AND EQUIPMENT

Tag Number	Description	AP1000 Class	Seismic Category	Principal Construction Code	Comments
Gland Seal System (GSS)					Location: Turbine Building
System components are Class D					
Generator Hydrogen and CO_2 Systems (HCS)					Location: Turbine Building
System components are Class E					
Heater Drain System (HDS)					Location: Turbine Building
System components are Class E					
Hydrogen Seal Oil System (HSS)					Location: Turbine Building
System components are Class E					
Incore Instrumentation System (IIS)					Location: Containment
n/a	IIS Guide Tubes	A	I	ASME III-1	
n/a	Thimble assemblies	D	NS	Manufacturer Std.	
Main Turbine and Generator Lube Oil System (LOS)					Location: Turbine Building
System components are Class E					
Mechanical Handling System (MHS)					Location: Various
MHS-MH-01	Containment Polar Crane	C	I	ASME NOG-1	
MHS-MH-02	Cask Handling Hoist	C	I	NUREG-0554	
MHS-MH-05	Equipment Hatch Hoist	C	I	Manufacturer Std.	
MHS-MH-06	Maintenance Hatch Hoist	~~D~~C	I	Manufacturer Std.	
Balance of system components are Class E					
Main Steam System (MSS)					Location: Turbine Building
System components are Class E					
Main Turbine System (MTS)					Location: Turbine Building
System components are Class E					
Passive Containment Cooling System (PCS)					Location: Containment Shield Building and Auxiliary Building
PCS-MT-01	Passive Containment Cooling Water Storage Tank	C	I	ACI 349	See subsection 6.2.2.2.3 for additional design requirements
PCS-MT-03	Water Distribution Bucket	C	I	Manufacturer Std.	See subsection 6.2.2.2.3 for additional design requirements

Table 3.2-3 (Sheet 11 of 65)

AP1000 CLASSIFICATION OF MECHANICAL AND FLUID SYSTEMS, COMPONENTS, AND EQUIPMENT

Tag Number	Description	AP1000 Class	Seismic Category	Principal Construction Code	Comments
Passive Containment Cooling System (Continued)					
PCS-PL-V040	Recirculation Pump Suction from PCCAWST Isolation Valve	D	NS	ANSI 16.34	Equipment Anchorage is Seismic Category II
PCS-PL-V041	PCCAWST Recirculation Return Line Isolation Valve	D	NS	ANSI 16.34	Equipment Anchorage is Seismic Category II
PCS-PL-V042	PCCWST Long-Term Makeup Isolation Drain Valve	C	I	ASME III-3	PCS-PL-V043
PCS-PL-V043	PCCAWST Recirculation Return Line Drain Isolation Valve	D	NS	ANSI 16.34	Equipment Anchorage is Seismic Category II
PCS-PL-V044	PCCWST Long-Term Makeup Isolation Valve	C	I	ASME III-3	
PCS-PL-V045	Emergency Makeup to the Spent Fuel Pool Isolation Valve	C	I	ASME III-3	
PCS-PL-V046	PCCWST Recirculation Return Isolation Valve	C	I	ASME III-3	
~~PCS-PL-V047~~	~~PCCWST Discharge Line Cross-Connect Isolation Valve~~	~~C~~	~~I~~	~~ASME III-3~~	
PCS-PL-V048	Recirculation Pump Fire Suction Isolation Valve	D	NS	ANSI 16.34	Seismically analyzed for operability
PCS-PL-V049	Emergency Makeup to the Spent Fuel Pool Drain Isolation Valve	C	I	ASME III-3	
PCS-PL-V050	Spent Fuel Pool Long Term Makeup Isolation Valve	C	I	ASME III-3	
PCS-PL-V051	Spent Fuel Pool Emergency Makeup Lower Isolation	C	I	ASME III-3	

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AP1000 CLASSIFICATION OF MECHANICAL AND FLUID SYSTEMS, COMPONENTS, AND EQUIPMENT

Tag Number	Description	AP1000 Class	Seismic Category	Principal Construction Code	Comments
Passive Containment Cooling System (Continued)					
PCS-PL-V100	Temporary Containment Washdown Isolation Valve	D	NS	ANSI 16.34	Equipment Anchorage is Seismic Category II
PCS-PL-V052	Spent Fuel Pool Emergency Makeup Isolation	C	I	ASME III-3	
PCS-PY-B01	Blind/Spectacle Flange	C	I	ASME III-3	
Balance of system components are Class E					
Plant Gas Systems (PGS)					Location: Various
System components are Class E					
Primary Sampling System (PSS)					Location: Containment and Auxiliary Building
n/a	Grab Sample Unit	D	NS	Manufacturer Std.	
n/a	Sample Cooler, PSS and CCS Side	D	NS	ASME VIII/ TEMA	
n/a	Valves Providing PSS AP1000 Equipment Class D Function	D	NS	ANSI 16.34	
PSS-PL-V001A	Hot Leg Sample Isolation	B	I	ASME III-2	
PSS-PL-V001B	Hot Leg Sample Isolation	B	I	ASME III-2	
PSS-PL-V003	Pressurizer Liquid Isolation	B	I	ASME III-2	
PSS-PL-V004A	PXS Accumulator Sample Isolation	C	I	ASME III-3	
PSS-PL-V004B	PXS Accumulator Sample Isolation	C	I	ASME III-3	
PSS-PL-V005A	PXS CMT A Sample Isolation	B	I	ASME III-2	
PSS-PL-V005B	PXS CMT B Sample Isolation	B	I	ASME III-2	
PSS-PL-V005C	PXS CMT A Sample Isolation	B	I	ASME III-2	
PSS-PL-V005D	PXS CMT B Sample Isolation	B	I	ASME III-2	
PSS-PL-V008	Containment Air Sample Containment Isolation IRC	B	I	ASME III-2	
PSS-PL-V010A	Liquid Sample Line Containment Isolation IRC	B	I	ASME III-2	

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AP1000 CLASSIFICATION OF MECHANICAL AND FLUID SYSTEMS, COMPONENTS, AND EQUIPMENT

Tag Number	Description	AP1000 Class	Seismic Category	Principal Construction Code	Comments
Primary Sampling System (Continued)					
PSS-PL-V010B	Liquid Sample Line Containment Isolation IRC	B	I	ASME III-2	
PSS-PL-V011	Liquid Sample Line Containment Isolation ORC	B	I	ASME III-2	
PSS-PL-V012A	Liquid Sample Check Valve	C	I	ASME III-3	
PSS-PL-V012B	Liquid Sample Check Valve	C	I	ASME III-3	
PSS-PL-V023	Sample Return Line Containment Isolation ORC	B	I	ASME III-2	
PSS-PL-V024	Sample Return Containment Isolation Check IRC	B	I	ASME III-2	
PSS-PL-V046	Air Sample Line Containment Isolation ORC	B	I	ASME III-2	
PSS-PL-V076A	Containment Testing Boundary Isolation Valve	C	I	ASME III-3	
PSS-PL-V076B	Containment Testing Boundary Isolation Valve	C	I	ASME III-3	
PSS-PL-V082	Containment Isolation Test Connection Isolation Valve	C	I	ASME III-3	
PSS-PL-V083	Containment Isolation Test Connection Isolation Valve	C	I	ASME III-3	
PSS-PL-V085	Containment Isolation Test Connection Isolation Valve	B	I	ASME III-2	
PSS-PL-V086	Containment Isolation Test Connection Isolation Valve	C	I	ASME III-3	
PSS-PY-C01	Common Primary Sample Line Penetration	B	I	ASME III, MC	
PSS-PY-C02	Containment Atmosphere Sample Line Penetration	B	I	ASME III, MC	
PSS-PY-C03	Containment Atmosphere Sample Line Penetration	B	I	ASME III, MC	
Balance of system components are Class E					
Potable Water System (PWS)					**Location: Various**
PWS-PL-V418	MCR Potable Water Inlet Check Valve	B	I	ASME III-2	
PWS-PL-V420	PWS MCR Isolation Valve	B	I	ASME III-2	
Balance of System components are Class E					

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AP1000 CLASSIFICATION OF MECHANICAL AND FLUID SYSTEMS, COMPONENTS, AND EQUIPMENT

Tag Number	Description	AP1000 Class	Seismic Category	Principal Construction Code	Comments
Passive Core Cooling System (Continued)					
PXS-PL-V117A	Containment Recirculation A Isolation	C	I	ASME III-3	
PXS-PL-V117B	Containment Recirculation B Isolation	C	I	ASME III-3	
PXS-PL-V118A	Containment Recirculation A Isolation	C	I	ASME III-3	
PXS-PL-V118B	Containment Recirculation B Isolation	C	I	ASME III-3	
PXS-PL-V119A	Containment Recirculation A Check	C	I	ASME III-3	
PXS-PL-V119B	Containment Recirculation B Check	C	I	ASME III-3	
PXS-PL-V120A	Containment Recirculation A Isolation	C	I	ASME III-3	
PXS-PL-V120B	Containment Recirculation B Isolation	C	I	ASME III-3	
PXS-PL-V121A	IRWST Line A Isolation	C	I	ASME III-3	
PXS-PL-V121B	IRWST Line B Isolation	C	I	ASME III-3	
PXS-PL-V122A	IRWST Injection A Check	A	I	ASME III-1	
PXS-PL-V122B	IRWST Injection B Check	A	I	ASME III-1	
PXS-PL-V123A	IRWST Injection A Isolation	A	I	ASME III-1	
PXS-PL-V123B	IRWST Injection B Isolation	A	I	ASME III-1	
PXS-PL-V124A	IRWST Injection A Check	A	I	ASME III-1	
PXS-PL-V124B	IRWST Injection B Check	A	I	ASME III-1	
PXS-PL-V125A	IRWST Injection A Isolation	A	I	ASME III-1	
PXS-PL-V125B	IRWST Injection B Isolation	A	I	ASME III-1	
PXS-PL-V126A	IRWST Injection Check Test	C	I	ASME III-3	
PXS-PL-V126B	IRWST Injection Check Test	C	I	ASME III-3	
~~PXS-PL-V127~~	~~IRWST to Containment Sump~~	~~C~~	~~I~~	~~ASME III-3~~	
PXS-PL-V128A	IRWST Injection Check Test	B	I	ASME III-2	
PXS-PL-V128B	IRWST Injection Check Test	B	I	ASME III-2	
PXS-PL-V129A	IRWST Injection Check Test	B	I	ASME III-2	
PXS-PL-V129B	IRWST Injection Check Test	B	I	ASME III-2	

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AP1000 CLASSIFICATION OF MECHANICAL AND FLUID SYSTEMS, COMPONENTS, AND EQUIPMENT

Tag Number	Description	AP1000 Class	Seismic Category	Principal Construction Code	Comments
Reactor Coolant System (Continued)					
~~RCS-PL-V203~~	~~Pressurizer Steam Space Sample Isolation~~	~~B~~	~~I~~	~~ASME III-2~~	
RCS-PL-V204	Pressurizer Manual Vent	A	I	ASME III-1	
RCS-PL-V205	Pressurizer Manual Vent	A	I	ASME III-1	
RCS-PL-V210A	Pressurizer Spray Bypass	B	I	ASME III-2	
RCS-PL-V210B	Pressurizer Spray Bypass	B	I	ASME III-2	
RCS-PL-V225A	Pressurizer Level Steam Space Instrument Root	B	I	ASME III-2	
RCS-PL-V225B	Pressurizer Level Steam Space Instrument Root	B	I	ASME III-2	
RCS-PL-V225C	Pressurizer Level Steam Space Instrument Root	B	I	ASME III-2	
RCS-PL-V225D	Pressurizer Level Steam Space Instrument Root	B	I	ASME III-2	
RCS-PL-V226A	Pressurizer Level Liquid Space Instrument Root	B	I	ASME III-2	
RCS-PL-V226B	Pressurizer Level Liquid Space Instrument Root	B	I	ASME III-2	
RCS-PL-V226C	Pressurizer Level Liquid Space Instrument Root	B	I	ASME III-2	
RCS-PL-V226D	Pressurizer Level Liquid Space Instrument Root	B	I	ASME III-2	
RCS-PL-V228	Wide Range Pressurizer Level Steam Space Instrument Root	B	I	ASME III-2	
RCS-PL-V229	Wide Range Pressurizer Level Liquid Space Instrument Root	B	I	ASME III-2	
RCS-PL-V232	Manual Head Vent	C	I	ASME III-3	
RCS-PL-V233	Head Vent Isolation	C	I	ASME III-3	
RCS-PL-V241	ADS Valve Discharge Header Drain Isolation	C	I	ASME III-3	
RCS-PL-V242	ADS Valve Discharge Header Drain Check	D	NS	ANSI 16.34	

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AP1000 CLASSIFICATION OF MECHANICAL AND FLUID SYSTEMS, COMPONENTS, AND EQUIPMENT

Tag Number	Description	AP1000 Class	Seismic Category	Principal Construction Code	Comments
Normal Residual Heat Removal System (Continued)					
RNS-PL-V011	RNS Discharge Containment Isolation Valve - ORC	B	I	ASME III-2	
RNS-PL-V012	RNS Discharge Containment Isolation Valve Test Connection ORC	B	I	ASME III-2	
RNS-PL-V013	RNS Discharge Containment Isolation - IRC	B	I	ASME III-2	
RNS-PL-V014	RNS Discharge Containment Isolation Valve Test Connection	C	I	ASME III-3	
RNS-PL-V015A	RNS Discharge RCS Pressure Boundary	A	I	ASME III-1	
RNS-PL-V015B	RNS Discharge RCS Pressure Boundary	A	I	ASME III-1	
RNS-PL-V016	RNS Discharge Containment Penetration Isolation Valves Test	C	I	ASME III-3	
RNS-PL-V017A	RNS Discharge RCS Pressure Boundary	A	I	ASME III-1	
RNS-PL-V017B	RNS Discharge RCS Pressure Boundary	A	I	ASME III-1	
RNS-PL-V021	RNS HL Suction Pressure Relief	B	I	ASME III-2	
RNS-PL-V022	RNS Suction Header Containment Isolation - ORC	B	I	ASME III-2	
RNS-PL-V023	RNS Suction from IRWST - Containment Isolation	B	I	ASME III-2	
RNS-PL-V024	RNS Discharge to IRWST Isolation	C	I	ASME III-3	
~~RNS-PL-V025A~~	~~RNS HX A Bypass Flow Instrument Isolation~~	~~C~~	~~I~~	~~ASME III-3~~	
~~RNS-PL-V025B~~	~~RNS HX B Bypass Flow Instrument Isolation~~	~~C~~	~~I~~	~~ASME III-3~~	
~~RNS-PL-V026A~~	~~RNS HX A Bypass Flow Instrument Isolation~~	~~C~~	~~I~~	~~ASME III-3~~	

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AP1000 CLASSIFICATION OF MECHANICAL AND FLUID SYSTEMS, COMPONENTS, AND EQUIPMENT

Tag Number	Description	AP1000 Class	Seismic Category	Principal Construction Code	Comments
Normal Residual Heat Removal System (Continued)					
~~RNS-PL-V026B~~	~~RNS HX B Bypass Flow Instrument Isolation~~	~~C~~	~~I~~	~~ASME III-3~~	
RNS-PL-V029	RNS Discharge to CVS	C	I	ASME III-3	
RNS-PL-V030A	RNS HX A Shell Drain	D	NS	ANSI B31.1	
RNS-PL-V030B	RNS HX B Shell Drain	D	NS	ANSI B31.1	
RNS-PL-V031A	RNS Train A Discharge Flow Instrument Isolation	C	I	ASME III-3	
RNS-PL-V031B	RNS Train B Discharge Flow Instrument Isolation	C	I	ASME III-3	
RNS-PL-V032A	RNS Train A Discharge Flow Instrument Isolation	C	I	ASME III-3	
RNS-PL-V032B	RNS Train B Discharge Flow Instrument Isolation	C	I	ASME III-3	
RNS-PL-V033A	RNS Pump A Suction Pressure Instrument Isolation	C	I	ASME III-3	
RNS-PL-V033B	RNS Pump B Suction Pressure Instrument Isolation	C	I	ASME III-3	
RNS-PL-V034A	RNS Pump A Discharge Pressure Instrument Isolation	C	I	ASME III-3	
RNS-PL-V034B	RNS Pump B Discharge Pressure Instrument Isolation	C	I	ASME III-3	
RNS-PL-V035A	RNS HX A Shell Vent	D	NS	ANSI 16.34	
RNS-PL-V035B	RNS HX B Shell Vent	D	NS	ANSI 16.34	
RNS-PL-V036A	RNS Pump A Suction Piping Drain. Isolation	C	I	ASME III-3	
RNS-PL-V036B	RNS Pump B Suction Piping Drain. Isolation	C	I	ASME III-3	
RNS-PL-V045	RNS Pump Discharge Relief	C	I	ASME III-3	
RNS-PL-V046	RNS HX A Channel Head Drain. Isolation	C	I	ASME III-3	
RNS-PL-V048	RNS HX B Channel Head Drain. Isolation	C	I	ASME III-3	
RNS-PL-V050	RNS Pump A Casing Drain. Isolation	C	I	ASME III-3	

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AP1000 CLASSIFICATION OF MECHANICAL AND FLUID SYSTEMS, COMPONENTS, AND EQUIPMENT

Tag Number	Description	AP1000 Class	Seismic Category	Principal Construction Code	Comments
Spent Fuel Pool Cooling System (Continued)					
SFS-PL-V041	SFS Cask Loading Pit Drain Isolation	C	I	ASME III-3	
SFS-PL-V042	Cask Loading Pit to Pump Suction Isolation	C	I	ASME III-3	
SFS-PL-V043	SFS CVS Makeup Reverse Flow Prevention	C	I	ASME III-3	
SFS-PL-V045	SFS Discharge to Cask Loading Pit Isolation	C	I	ASME III-3	
SFS-PL-V047	SFS Demineralized Water Makeup to SFP Reverse Flow Prevent	~~C~~D	~~I~~NS	~~ASME III-3~~ANSI B31.1	
SFS-PL-V048	SFS Containment Penetration Test Connection	B	I	ASME III-2	
SFS-PL-V049	SFS Cask Loading Pit Drain to WLS Isolation	C	I	ASME III-3	
SFS-PL-V056	SFS Containment Penetration Test Connection Isolation	B	I	ASME III-2	
SFS-PL-V058	SFS Containment Isolation Valve V034 Test	C	I	ASME III-3	
SFS-PL-V066	Spent Fuel Pool to Cask Washdown Pit Isolation	C	I	ASME III-3	
SFS-PL-V068	Cask Washdown Pit Drain Isolation	C	I	ASME III-3	
Steam Generator System (SGS)				Location: Containment and Auxiliary Building	
SFS-PL-V071	Refueling Cavity Overflow to SG Compartment	C	I	ASME III-3	
SFS-PL-V072	Refueling Cavity Overflow to SG Compartment	C	I	ASME III-3	
SFS-PY-C01	Spent Fuel Cooling Pump Discharge to IRWST	B	I	ASME III, MC	
SFS-PY-C02	Spent Fuel Cooling Pump Suction from IRWST	B	I	ASME III, MC	
Balance of system components are Class D					

Table 3.2-3 (Sheet 56 of 65)

AP1000 CLASSIFICATION OF MECHANICAL AND FLUID SYSTEMS, COMPONENTS, AND EQUIPMENT

Tag Number	Description	AP1000 Class	Seismic Category	Principal Construction Code	Comments
Main Control Room Emergency Habitability System (Continued)					
VES-PL-V002A	Pressure Regulating Valve A	C	I	ASME III-3	
VES-PL-V002B	Pressure Regulating Valve B	C	I	ASME III-3	
VES-PL-V005A	Air Delivery Main Isolation Valve A	C	I	ASME III-3	
VES-PL-V005B	Air Delivery Main Isolation Valve B	C	I	ASME III-3	
VES-PL-V006A	Air Delivery Line Pressure Instrument Isolation Valve A	C	I	ASME III-3	
VES-PL-V006B	Air Delivery Line Pressure Instrument Isolation Valve B	C	I	ASME III-3	
~~VES-PL-V008A~~	~~Refill CheckValve A~~	~~C~~	~~I~~	~~ASME III-3~~	
~~VES-PL-V008B~~	~~Refill CheckValve B~~	~~C~~	~~I~~	~~ASME III-3~~	
VES-PL-V016	Temporary Instrument Isolation Valve A	C	I	ASME III-3	
VES-PL-V018	Temporary Instrument Isolation Valve A	C	I	ASME III-3	
VES-PL-V019	Temporary Instrument Isolation Valve B	C	I	ASME III-3	
VES-PL-V020	Temporary Instrument Isolation Valve B	C	I	ASME III-3	
VES-PL-V022A	Pressure Relief Isolation Valve A	C	I	ASME III-3	
VES-PL-V022B	Pressure Relief Isolation Valve B	C	I	ASME III-3	
VES-PL-V024A	Air Tank Isolation Valve A	C	I	ASME III-3	
VES-PL-V024B	Air Tank Isolation Valve B	C	I	ASME III-3	
VES-PL-V025A	Air Tank Isolation Valve A	C	I	ASME III-3	
VES-PL-V025B	Air Tank Isolation Valve B	C	I	ASME III-3	
VES-PL-V038	Makeup Air Stop Valve	C	I	ASME III-3	
VES-PL-V040A	Air Tank Safety Relief Valve A	C	I	ASME III-3	
VES-PL-V040B	Air Tank Safety Relief Valve B	C	I	ASME III-3	
VES-PL-V041A	Air Tank Safety Relief Valve A	C	I	ASME III-3	

Table 3.2-3 (Sheet 57 of 65)

AP1000 CLASSIFICATION OF MECHANICAL AND FLUID SYSTEMS, COMPONENTS, AND EQUIPMENT

Tag Number	Description	AP1000 Class	Seismic Category	Principal Construction Code	Comments
Main Control Room Emergency Habitability System (Continued)					
VES-PL-V041B	Air Tank Safety Relief Valve B	C	I	ASME III-3	
~~VES-PL-V042~~	~~Refill Header Manual Vent Valve~~	~~C~~	~~I~~	~~ASME III-3~~	
VES-PL-V043A	Differential Pressure Instrument Line Isolation Valve A	C	I	ASME III-3	
VES-PL-V043B	Differential Pressure Instrument Line Isolation Valve B	C	I	ASME III-3	
VES-PL-V044	Main Air Flowpath Isolation Valve	C	I	ASME III-3	
Containment Air Filtration System (VFS)			Location: Auxiliary Building and Annex Building		
VFS-PY-C01	Containment Supply Duct Penetration	B	I	ASME III, MC	
VFS-PY-C02	Containment Exhaust Duct Penetration	B	I	ASME III, MC	
VFS-MY-Y01	Containment Air Supply Debris Screen	C	I	ASME Sec. III Class 3	
VFS-MY-Y02	Containment Air Exhaust Debris Screen	C	I	ASME Sec. III Class 3	
VFS-PL-V001	Containment Isolation Test Connection	B	I	ASME III-2	
VFS-PL-V002	Containment Isolation Test Connection	C	I	ASME III-3	
VFS-PL-V003	Containment Purge Supply Containment Isolation Valve	B	I	ASME III-2	
VFS-PL-V004	Containment Purge Supply Containment Isolation Valve	B	I	ASME III-2	
VFS-PL-V006	Containment Isolation Test Connection	C	I	ASME III-3	
VFS-PL-V007	Containment Isolation Test Connection	B	I	ASME III-2	
VFS-PL-V008	Containment Isolation Test Connection	B	I	ASME III-2	

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DCD Chapter 3 Section 3.11 Changes:

Change 3.11-1:

3.11.1.1 Equipment Identification

A complete list of environmentally qualified electrical and mechanical equipment that is essential to emergency reactor shutdown, containment isolation, reactor core cooling, or containment and reactor heat removal, or that is otherwise essential in preventing significant release of radioactive material to the environment, is provided in Table 3.11-1. A list of environmentally qualified electrical and mechanical equipment and a summary of electrical and mechanical equipment qualification results are maintained as part of the equipment qualification file. The ~~Combined License applicant is responsible for verification that the~~ equipment qualification file is maintained during the equipment selection and procurement phase as defined in Section 3.11.5.

Change 3.11-2:

3.11.1.2 Definition of Environmental Conditions

Appendix 3D identifies applicable normal, abnormal, and design basis accident environmental conditions conforming to General Design Criterion 4. These environmental conditions are associated with various plant areas by an environmental zone, as noted in Table 3D.5-1 and Table 3.11-1.

For mild environments, the area conditions do not change as the result of an accident. There are no degrading environmental effects that lead to common mode failure of the equipment. The qualification of mechanical and electrical equipment located in a mild environment is demonstrated by conducting the plant surveillance activities carried out during the operational phase of the plant.

The environmental conditions identified in Appendix 3D are defined as follows.

Normal operating environmental conditions are defined as those conditions existing during routine plant operations for which the equipment is expected to be available on a continuous basis to perform required functions.

Abnormal environmental conditions are those plant conditions for which the equipment is designed to operate for a period of time without accelerating normal periodic tests, inspections, and maintenance schedules for that equipment. The maximum and minimum conditions identified as the abnormal condition are based on the design limits for the affected areas.

Design basis accident (DBA) and post-design basis accident conditions are those plant conditions resulting from various postulated equipment and piping failures during which the equipment identified in Table 3.11-1 must operate without impairment of the function. The design basis

accident and post-design basis accident conditions are discussed in Appendix 3D.

Compatibility of equipment with the specified environmental conditions is achieved by the following.

Systems and components required to mitigate the consequences of a design basis accident or to perform safe shutdown operation are qualified to remain functional after exposure to the environmental conditions in Table 3D.5-5.

Environmentally qualified equipment exposed to a harsh environment has a qualified life goal of 60 years. Demonstration of qualified life by test or test and analysis is provided ~~by the Combined License applicant,~~ to address applicable aging effects. For critical components susceptible to aging, a qualified life is established that includes the effects of the total integrated radiation dose experienced at their respective locations within the plant. When a 60-year qualified life is not achievable, a shorter qualified life is established, and a replacement program is implemented.

For equipment located in a mild environment, a design life goal is established by using known significant aging mechanisms and reliability data.

Equipment qualification takes into account the most severe environmental conditions resulting from the design basis high-energy line break. Included in these conditions are the short-term peak transient temperature following a main steamline break (MSLB) and a radiation exposure and temperature due to a loss of coolant accident (LOCA) within the reactor containment.

Postulated high-energy line failures as defined in subsection 3.6.2.1.2 are assumed in areas where high-energy lines greater than 1 inch are routed. Essential equipment is protected against the effects of jet impingement (subsection 3.6.2.4.1) and evaluated for spray effects if required (subsection 3.6.2.7).

Active mechanical equipment is qualified for operability as discussed in subsection 3.9.3 and Section 3.10. This operability program, combined with the qualification of the electrical appurtenances (valve operators, solenoids, limit switches), demonstrates qualification under required environmental conditions. Active mechanical equipment is defined as equipment that performs a mechanical motion as part of its safety-related function.

Nonactive mechanical equipment whose only safety function is structural integrity is designed according to ASME Code guidelines. The accident and post-accident environmental effects are considered in the design of such structural components as pump casings and valve bodies.

The environmental qualification program is restricted to evaluating the design of critical nonmetallic subcomponents of active devices in a harsh environment, where failure results in loss of the active component.

In the event of potential flooding/wetting, one of the following criteria is applied for protection of equipment for service in such an environment:

- Equipment will be qualified for submergence due to flooding/wetting.
- Equipment will be protected from wetting due to spray.

Equipment will be evaluated to show that failure of the equipment due to flooding/wetting is acceptable since its safety-related function is not required or has otherwise been accomplished.

Change 3.11-3:

3.11.2.1 Environmental Qualification of Electrical Equipment

The AP1000 approach for environmental qualification of Class 1E equipment is outlined in Appendix 3D. This methodology is developed based on the guidelines provided in IEEE 323-1974 (Reference 1)~~, and 344-1987 (Reference 2)~~.

Qualification for equipment in a harsh environment is based on type testing or testing and analysis. Analysis may be used to determine significant aging mechanisms in mild environment applications. Type testing includes thermal and mechanical aging, radiation, and exposure to extremes of environmental, seismic, and vibration effects. Type testing is done with representative samples of the production line equipment according to the sequence indicated in IEEE 323-1974 to the specified service conditions, including margin. The testing takes into account normal and abnormal plant operation and design basis accident and post-design basis accident operations, as required.

When reliable data and proven analytical methods are available, environmental qualification may be based on analysis supported by partial type test data. This method includes justification of the methods, theories, and assumptions used (that is, mathematical or logical proof based on actual test data) that the equipment meets or exceeds its specified performance requirements when subjected to normal, abnormal, and design basis accident environmental conditions.

Regulatory guides providing guidance for meeting the requirements of 10CFR50, Appendix A, General Design Criteria 1, 4, 23, and 50; Appendix B, Criteria III, XI, and XVII to 10CFR50 and 10CFR50.49, include Regulatory Guide 1.89, Regulatory Guide 1.30, Regulatory Guide 1.63, Regulatory Guide 1.73, Regulatory Guide 1.100, and Regulatory Guide 1.131. The maintenance surveillance program follows the guidance of Regulatory Guide 1.33.

Additional information regarding conformance with each of these regulatory guides is given in Section 1.9.

Change 3.11-1:

3.11.5 Combined License Information Item for Equipment Qualification File

~~The Combined License applicant is responsible for the maintenance of the equipment qualification file during the equipment selection and procurement phase.~~

Westinghouse Electric Company LLC will act as the agent for the COL holder during the equipment design phase, equipment selection and procurement phase, equipment qualification

phase, plant construction phase and ITAAC inspection phase.

The COL holder will define the process and procedures for which the equipment qualification files will be accepted from Westinghouse and how the files will be retained and maintained in an auditable format for the period that the equipment is installed and/or stored for future use in the nuclear power plant.

Change 3.11-3:

3.11.6 References

1. IEEE 323-1974, "IEEE Standard for Qualifying Class 1E Equipment for Nuclear Power Generating Stations."

2. ~~IEEE 344-1987, "IEEE Recommended Practices for Seismic Qualification of Class 1E Equipment for Nuclear Power Generating Stations."~~

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Title: Changes to AP1000 Design Control Document (DCD) Chapter 3.11 – Environmental Qualification of Mechanical and Electrical Equipment and Chapter 3 Appendix 3D – Methodology for Qualifying AP1000 Safety Related Electrical and Mechanical Equipment

Change 3.11-4:

Table 3.11-1 (Sheet 4 of 45)

ENVIRONMENTALLY QUALIFIED ELECTRICAL AND MECHANICAL EQUIPMENT

Description	AP1000 Tag No.	Envir. Zone (Note 2)	Function (Note 1)	Operating Time Required (Note 5)	Qualification Program (Note 6)
			PAMS	72 hr	
IDSS Spare Termination Box	IDSS-DF-2	2	RT	5 min	E
			ESF	24 hr	
			PAMS	24 hr	
IDSS Spare Termination Box	IDSS-DF-3	2	RT	5 min	E
			ESF	24 hr	
			PAMS	72 hr	
IDSS Spare Termination Box	IDSS-DF-4	2	RT	5 min	E
			ESF	24 hr	
			PAMS	72 hr	
IDSS Spare Termination Box	IDSS-DF-5	2	RT	5 min	E
			ESF	24 hr	
			PAMS	24 hr	
IDSS Spare Termination Box	IDSS-DF-6	2	RT	5 min	E
			ESF	24 hr	
			PAMS	24 hr	
MOTOR CONTROL CENTERS					
IDSA 125 Vdc MCC	IDSA-DK-1	2	ESF	24 hr	E
IDSB 125 Vdc MCC	IDSB-DK-1	2	ESF	24 hr	E
IDSC 125 Vdc MCC	IDSC-DK-1	2	ESF	24 hr	E
IDSD 125 Vdc MCC	IDSD-DK-1	2	ESF	24 hr	E
SWITCHBOARDS					
IDSA 125 Vdc Switchboard 1	IDSA-DS-1	2	RT	5 min	E
			ESF	24 hr	
			PAMS	24 hr	
IDSB 125 Vdc Switchboard 1	IDSB-DS-1	2	RT	5 min	E
			ESF	24 hr	
			PAMS	24 hr	
IDSB 125 Vdc Switchboard 2	IDSB-DS-2	2	RT	5 min	E
			ESF	24 hr	
			PAMS	72 hr	
IDSC 125 Vdc Switchboard 1	IDSC-DS-1	2	RT	5 min	E
			ESF	24 hr	
			PAMS	24 hr	
IDSC 125 Vdc Switchboard 2	IDSC-DS-2	2	RT	5 min	E
			ESF	24 hr	
			PAMS	72 hr	
IDSD 125 Vdc Switchboard 1	IDSD-DS-1	2	RT	5 min	E
			ESF	24 hr	
			PAMS	24 hr	

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Table 3.11-1 (Sheet 7 of 45)

ENVIRONMENTALLY QUALIFIED ELECTRICAL AND MECHANICAL EQUIPMENT

Description	AP1000 Tag No.	Envir. Zone (Note 2)	Function (Note 1)	Operating Time Required (Note 5)	Qualification Program (Note 6)
Core Makeup Tank A Narrow Range Lower Level	PXS-JE-LS013A	1	ESF PAMS	24 hr 4 mos	E *
Core Makeup Tank A Narrow Range Lower Level	PXS-JE-LS013B	1	ESF PAMS	24 hr 4 mos	E *
Core Makeup Tank A Narrow Range Lower Level	PXS-JE-LS013C	1	ESF PAMS	24 hr 4 mos	E *
Core Makeup Tank A Narrow Range Lower Level	PXS-JE-LS013D	1	ESF PAMS	24 hr 4 mos	E *
Core Makeup Tank B Narrow Range Lower Level	PXS-JE-LS014A	1	ESF PAMS	24 hr 4 mos	E *
Core Makeup Tank B Narrow Range Lower Level	PXS-JE-LS014B	1	ESF PAMS	24 hr 4 mos	E *
Core Makeup Tank B Narrow Range Lower Level	PXS-JE-LS014C	1	ESF PAMS	24 hr 4 mos	E *
Core Makeup Tank B Narrow Range Lower Level	PXS-JE-LS014D	1	ESF PAMS	24 hr 4 mos	E *
Containment Floodup Level	PXS-JE-LS050	1	PAMS	4 mos	E *
Containment Floodup Level	PXS-JE-LS051	1	PAMS	4 mos	E *
Containment Floodup Level	PXS-JE-LS052	1	PAMS	4 mos	E *
~~Accumulator Tank A Pressure~~	~~PXS-JE-LT-027~~	~~1~~	~~PAMS~~	~~4 mos~~	~~E * +~~
~~Accumulator Tank B Pressure~~	~~PXS-JE-LT-028~~	~~1~~	~~PAMS~~	~~4 mos~~	~~E * +~~
~~Accumulator Tank A Pressure~~	~~PXS-JE-LT-029~~	~~1~~	~~PAMS~~	~~4 mos~~	~~E * +~~
~~Accumulator Tank B Pressure~~	~~PXS-JE-LT-030~~	~~1~~	~~PAMS~~	~~4 mos~~	~~E * +~~

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Table 3.11-1 (Sheet 9 of 45)

ENVIRONMENTALLY QUALIFIED ELECTRICAL AND MECHANICAL EQUIPMENT

Description	AP1000 Tag No.	Envir. Zone (Note 2)	Function (Note 1)	Operating Time Required (Note 5)	Qualification Program (Note 6)
RADIATION MONITORS					
~~Blowdown Discharge Radiation~~	~~BDS-JE-RE-010~~	~~8~~	~~PAMS~~	~~2 wks~~	~~E +~~
~~Blowdown Brine Radiation~~	~~BDS-JE-RE-011~~	~~8~~	~~PAMS~~	~~2 wks~~	~~E +~~
Containment High Range Area Monitor	PXS-JE-RE160	1	ESF PAMS	24 hr 4 mos	E *
Containment High Range Area Monitor	PXS-JE-RE161	1	ESF PAMS	24 hr 4 mos	E *
Containment High Range Area Monitor	PXS-JE-RE162	1	ESF PAMS	24 hr 4 mos	E *
Containment High Range Area Monitor	PXS-JE-RE163	1	ESF PAMS	24 hr 4 mos	E *
~~Main Steamline Radiation~~	~~SGS-JE-RE-026~~	~~5~~	~~PAMS~~	~~2 wks~~	~~E +~~
~~Main Steamline Radiation~~	~~SGS-JE-RE-027~~	~~5~~	~~PAMS~~	~~2 wks~~	~~E +~~
~~Turbine Island Vent Radiation~~	~~TDS-JE-RE-001~~	~~8~~	~~PAMS~~	~~2 wks~~	~~E +~~
Control Room Supply Air Radiation Monitor	VBS-JE-RE001A	3	ESF PAMS	24 hr 2 wks	E
Control Room Supply Air Radiation Monitor	VBS-JE-RE001B	3	ESF PAMS	24 hr 2 wks	E
~~Plant Vent Radiation Mid Range~~	~~VFS-JE-RE-104A~~	~~7~~	~~PAMS~~	~~2 wks~~	~~E +~~
~~Plant Vent Radiation High Range~~	~~VFS-JE-RE-104B~~	~~7~~	~~PAMS~~	~~2 wks~~	~~E +~~
RESISTANCE TEMPERATURE DETECTORS					
PRHR HX Outlet Temperature	RCS-JE-TE161	1	PAMS	4 mos	E *
RCS Cold Leg 1A Narrow Range Temperature	RCS-JE-TE121A	1	RT ESF	5 min 5 min	E *
RCS Cold Leg 1A Narrow Range Temperature	RCS-JE-TE121D	1	RT ESF	5 min 5 min	E *
RCS Cold Leg 1B Narrow Range Temperature	RCS-JE-TE121B	1	RT ESF	5 min 5 min	E *
RCS Cold Leg 1B Narrow Range Temperature	RCS-JE-TE121C	1	RT ESF	5 min 5 min	E *
RCS Cold Leg 2A Narrow Range Temperature	RCS-JE-TE122B	1	RT ESF	5 min 5 min	E *
RCS Cold Leg 2A Narrow Range Temperature	RCS-JE-TE122C	1	RT ESF	5 min 5 min	E *
RCS Cold Leg 2B Narrow Range Temperature	RCS-JE-TE122A	1	RT ESF	5 min 5 min	E *
RCS Cold Leg 2B Narrow Range Temperature	RCS-JE-TE122D	1	RT ESF	5 min 5 min	E *
RCS Hot Leg 1 Narrow Range Temperature	RCS-JE-TE131A	1	RT ESF	5 min 5 min	E *
RCS Hot Leg 1 Narrow Range Temperature	RCS-JE-TE131C	1	RT ESF	5 min 5 min	E *

Table 3.11-1 (Sheet 10 of 45)

ENVIRONMENTALLY QUALIFIED ELECTRICAL AND MECHANICAL EQUIPMENT

Description	AP1000 Tag No.	Envir. Zone (Note 2)	Function (Note 1)	Operating Time Required (Note 5)	Qualification Program (Note 6)
RCS Hot Leg 1 Narrow Range Temperature	RCS-JE-TE132A	1	RT ESF	5 min 5 min	E *
RCS Hot Leg 1 Narrow Range Temperature	RCS-JE-TE132C	1	RT ESF	5 min 5 min	E *
RCS Hot Leg 1 Narrow Range Temperature	RCS-JE-TE133C	1	RT ESF	5 min 5 min	E *
RCS Hot Leg 1 Narrow Range Temperature	RCS-JE-TE133A	1	RT ESF	5 min 5 min	E *
RCS Hot Leg 2 Narrow Range Temperature	RCS-JE-TE131B	1	RT ESF	5 min 5 min	E *
RCS Hot Leg 2 Narrow Range Temperature	RCS-JE-TE131D	1	RT ESF	5 min 5 min	E *
RCS Hot Leg 2 Narrow Range Temperature	RCS-JE-TE132B	1	RT ESF	5 min 5 min	E *
RCS Hot Leg 2 Narrow Range Temperature	RCS-JE-TE132D	1	RT ESF	5 min 5 min	E *
RCS Hot Leg 2 Narrow Range Temperature	RCS-JE-TE133B	1	RT ESF	5 min 5 min	E *
RCS Hot Leg 2 Narrow Range Temperature	RCS-JE-TE133D	1	RT ESF	5 min 5 min	E *
RCS Cold Leg 1A Dual~~Wide~~ Range Temperature	RCS-JE-TE125A	1	PAMS	4 mos	E *
RCS Cold Leg 1B Dual~~Wide~~ Range Temperature	RCS-JE-TE125C	1	PAMS	4 mos	E *
RCS Cold Leg 2A Dual~~Wide~~ Range Temperature	RCS-JE-TE125B	1	PAMS	4 mos	E *
RCS Cold Leg 2B Dual~~Wide~~ Range Temperature	RCS-JE-TE125D	1	PAMS	4 mos	E *
RCS Hot Leg 1 Wide Range Temperature	RCS-JE-TE135A	1	PAMS	4 mos	E *
RCS Hot Leg 2 Wide Range Temperature	RCS-JE-TE135B	1	PAMS	4 mos	E *
PZR Reference Leg Level Temperature	RCS-JE-TE193A	1	RT ESF PAMS	5 min 5 min 4 mos	E *
PZR Reference Leg Level Temperature	RCS-JE-TE193B	1	RT ESF PAMS	5 min 5 min 4 mos	E *
PZR Reference Leg Level Temperature	RCS-JE-TE193C	1	RT ESF PAMS	5 min 5 min 4 mos	E *
PZR Reference Leg Level Temperature	RCS-JE-TE193D	1	RT ESF PAMS	5 min 5 min 4 mos	E *

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ENVIRONMENTALLY QUALIFIED ELECTRICAL AND MECHANICAL EQUIPMENT

Description	AP1000 Tag No.	Envir. Zone (Note 2)	Function (Note 1)	Operating Time Required (Note 5)	Qualification Program (Note 6)
~~Containment Temperature~~	~~VCS-JE-TE-053A~~	~~1~~	~~PAMS~~	~~4 mos~~	~~E * +~~
~~Containment Temperature~~	~~VCS-JE-TE-053B~~	~~1~~	~~PAMS~~	~~4 mos~~	~~E * +~~
SPEED SENSORS					
RCP 1A Pump Speed	RCS-JE-ST281	1	RT	Note 3	E *
RCP 1B Pump Speed	RCS-JE-ST282	1	RT	Note 3	E *
RCP 2A Pump Speed	RCS-JE-ST283	1	RT	Note 3	E *
RCP 2B Pump Speed	RCS-JE-ST284	1	RT	Note 3	E *
THERMOCOUPLES					
Incore Thermocouples	IIS-JE-TE001 through IIS-JE-TE042	1	PAMS	1 yr	E *
RCP 1A Bearing Water Temperature	RCS-JE-TE211A	1	RT	Note 3	E *
RCP 1A Bearing Water Temperature	RCS-JE-TE211B	1	RT	Note 3	E *
RCP 1A Bearing Water Temperature	RCS-JE-TE211C	1	RT	Note 3	E *
RCP 1A Bearing Water Temperature	RCS-JE-TE211D	1	RT	Note 3	E *
RCP 1B Bearing Water Temperature	RCS-JE-TE212A	1	RT	Note 3	E *
RCP 1B Bearing Water Temperature	RCS-JE-TE212B	1	RT	Note 3	E *
RCP 1B Bearing Water Temperature	RCS-JE-TE212C	1	RT	Note 3	E *
RCP 1B Bearing Water Temperature	RCS-JE-TE212D	1	RT	Note 3	E *
RCP 2A Bearing Water Temperature	RCS-JE-TE213A	1	RT	Note 3	E *
RCP 2A Bearing Water Temperature	RCS-JE-TE213B	1	RT	Note 3	E *
RCP 2A Bearing Water Temperature	RCS-JE-TE213C	1	RT	Note 3	E *
RCP 2A Bearing Water Temperature	RCS-JE-TE213D	1	RT	Note 3	E *
RCP 2B Bearing Water Temperature	RCS-JE-TE214A	1	RT	Note 3	E *
RCP 2B Bearing Water Temperature	RCS-JE-TE214B	1	RT	Note 3	E *
RCP 2B Bearing Water Temperature	RCS-JE-TE214C	1	RT	Note 3	E *
RCP 2B Bearing Water Temperature	RCS-JE-TE214D	1	RT	Note 3	E *

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ENVIRONMENTALLY QUALIFIED ELECTRICAL AND MECHANICAL EQUIPMENT

Description	AP1000 Tag No.	Envir. Zone (Note 2)	Function (Note 1)	Operating Time Required (Note 5)	Qualification Program (Note 6)
TRANSMITTERS					
PCS Water Delivery Flow	PCS-JE-FT001	9	PAMS	2 wks	E
PCS Water Delivery Flow	PCS-JE-FT002	9	PAMS	2 wks	E
PCS Water Delivery Flow	PCS-JE-FT003	9	PAMS	2 wks	E
PCS Water Delivery Flow	PCS-JE-FT004	9	PAMS	2 wks	E
PCS Storage Tank Water Level	PCS-JE-LT010	9	PAMS	2 wks	E
PCS Storage Tank Water Level	PCS-JE-LT011	9	PAMS	2 wks	E
PRHR HX Flow	PXS-JE-FT049A	1	PAMS	4 mos	E *
PRHR HX Flow	PXS-JE-FT049B	1	PAMS	4 mos	E *
RCS Hot Leg 1 Flow	RCS-JE-FT101A	1	RT	Note 3	E *
RCS Hot Leg 1 Flow	RCS-JE-FT101B	1	RT	Note 3	E *
RCS Hot Leg 1 Flow	RCS-JE-FT101C	1	RT	Note 3	E *
RCS Hot Leg 1 Flow	RCS-JE-FT101D	1	RT	Note 3	E *
RCS Hot Leg 2 Flow	RCS-JE-FT102A	1	RT	Note 3	E *
RCS Hot Leg 2 Flow	RCS-JE-FT102B	1	RT	Note 3	E *
RCS Hot Leg 2 Flow	RCS-JE-FT102C	1	RT	Note 3	E *
RCS Hot Leg 2 Flow	RCS-JE-FT102D	1	RT	Note 3	E *
SG1 Startup Feedwater Flow	SGS-JE-FT055A	2	ESF PAMS	5 min 2 wks	E
SG1 Startup Feedwater Flow	SGS-JE-FT055B	2	ESF PAMS	5 min 2 wks	E
SG2 Startup Feedwater Flow	SGS-JE-FT056A	2	ESF PAMS	5 min 2 wks	E
SG2 Startup Feedwater Flow	SGS-JE-FT056B	2	ESF PAMS	5 min 2 wks	E
MCR Air Delivery Line Flow Rate - A	VES-JE-FT003A	3	PAMS	72 hrs	E
MCR Air Delivery Line Flow Rate - B	VES-JE-FT003B	3	PAMS	72 hrs	E
Plant Vent Flow	VFS-JE-FT101	7	PAMS	2 wks	E +

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ENVIRONMENTALLY QUALIFIED ELECTRICAL AND MECHANICAL EQUIPMENT

Description	AP1000 Tag No.	Envir. Zone (Note 2)	Function (Note 1)	Operating Time Required (Note 5)	Qualification Program (Note 6)
SG2 Narrow Range Level	SGS-JE-LT007	1	RT ESF PAMS	5 min 5 min 4 mos	E *
SG2 Narrow Range Level	SGS-JE-LT008	1	RT ESF PAMS	5 min 5 min 4 mos	E *
SG1 Wide Range Level	SGS-JE-LT011	1	ESF PAMS	5 min 4 mos	E *
SG1 Wide Range Level	SGS-JE-LT012	1	ESF PAMS	5 min 4 mos	E *
SG1 Wide Range Level	SGS-JE-LT015	1	ESF PAMS	5 min 4 mos	E * E *
SG1 Wide Range Level	SGS-JE-LT016	1	ESF PAMS	5 min 4 mos	E * E *
SG2 Wide Range Level	SGS-JE-LT013	1	ESF PAMS	5 min 4 mos	E *
SG2 Wide Range Level	SGS-JE-LT014	1	ESF PAMS	5 min 4 mos	E *
SG2 Wide Range Level	SGS-JE-LT017	1	ESF PAMS	5 min 4 mos	E *
SG2 Wide Range Level	SGS-JE-LT018	1	ESF PAMS	5 min 4 mos	E *
Spent Fuel Pool Level	SFS-JE-LT019A	116	PAMS	2 wks	E**
Spent Fuel Pool Level	SFS-JE-LT019B	117	PAMS	2 wks	E**
Spent Fuel Pool Level	SFS-JE-LT019C	116	PAMS	2 wks	E**
Air Storage Tank Pressure - A	VES-JE-PT001A	7	PAMS	2 wks	E+
Air Storage Tank Pressure - B	VES-JE-PT001B	7	PAMS	2 wks	E+
Containment Pressure Normal Range	PCS-JE-PT005	1	ESF PAMS	5 min 4 mos	E *
Containment Pressure Normal Range	PCS-JE-PT006	1	ESF PAMS	5 min 4 mos	E *
Containment Pressure Normal Range	PCS-JE-PT007	1	ESF PAMS	5 min 4 mos	E *
Containment Pressure Normal Range	PCS-JE-PT008	1	ESF PAMS	5 min 4 mos	E *
Containment Pressure Extended Range	PCS-JE-PT012	1	PAMS	4 mos	E *
Containment Pressure Extended Range	PCS-JE-PT013	1	PAMS	4 mos	E *
Containment Pressure Extended Range	PCS-JE-PT014	1	PAMS	4 mos	E *

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ENVIRONMENTALLY QUALIFIED ELECTRICAL AND MECHANICAL EQUIPMENT

Description	AP1000 Tag No.	Envir. Zone (Note 2)	Function (Note 1)	Operating Time Required (Note 5)	Qualification Program (Note 6)
RCS Wide Range Pressure	RCS-JE-PT140A	1	PAMS ESF	4 mos 5 min	E *
RCS Wide Range Pressure	RCS-JE-PT140B	1	PAMS ESF	4 mos 5 min	E *
RCS Wide Range Pressure	RCS-JE-PT140C	1	PAMS ESF	4 mos 5 min	E *
RCS Wide Range Pressure	RCS-JE-PT140D	1	PAMS ESF	4 mos 5 min	E *
PZR Pressure	RCS-JE-PT191A	1	RT ESF PAMS	5 min 5 min 4 mos	E *
PZR Pressure	RCS-JE-PT191B	1	RT ESF PAMS	5 min 5 min 4 mos	E *
PZR Pressure	RCS-JE-PT191C	1	RT ESF PAMS	5 min 5 min 4 mos	E *
PZR Pressure	RCS-JE-PT191D	1	RT ESF PAMS	5 min 5 min 4 mos	E *
Main Steamline SG1 Pressure	SGS-JE-PT030	1	ESF PAMS	5 min 2 wks	E *
Main Steamline SG1 Pressure	SGS-JE-PT031	2	ESF PAMS	5 min 2 wks	E
Main Steamline SG1 Pressure	SGS-JE-PT032	1	ESF PAMS	5 min 2 wks	E *
Main Steamline SG1 Pressure	SGS-JE-PT033	2	ESF PAMS	5 min 2 wks	E
Main Steamline SG2 Pressure	SGS-JE-PT034	1	ESF PAMS	5 min 2 wks	E *
Main Steamline SG2 Pressure	SGS-JE-PT035	2	ESF PAMS	5 min 2 wks	E
Main Steamline SG2 Pressure	SGS-JE-PT036	1	ESF PAMS	5 min 2 wks	E *
Main Steamline SG2 Pressure	SGS-JE-PT037	2	ESF PAMS	5 min 2 wks	E
Main Control Room Differential Pressure	VES-JE-PDT004A	3	ESF PAMS	2 wks 2 wks	E
Main Control Room Differential Pressure	VES-JE-PDT004B	3	ESF PAMS	2 wks 2 wks	E

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ENVIRONMENTALLY QUALIFIED ELECTRICAL AND MECHANICAL EQUIPMENT

Description	AP1000 Tag No.	Envir. Zone (Note 2)	Function (Note 1)	Operating Time Required (Note 5)	Qualification Program (Note 6)
PROTECTION AND SAFETY MONITORING SYSTEMS					
Protection and Safety Monitoring System Cabinets	Multiple (Note 7)	2	RT ESF PAMS	5 min 24 hr 2 wks	E
~~**MAIN CONTROL ROOM**~~					
~~Operator Workstation A~~	~~N/A~~	~~3~~	~~RT~~ ~~ESF~~ ~~PAMS~~	~~5 min~~ ~~24 hr~~ ~~2 wks~~	~~E~~
~~Operator Workstation B~~	~~N/A~~	~~3~~	~~RT~~ ~~ESF~~ ~~PAMS~~	~~5 min~~ ~~24 hr~~ ~~2 wks~~	~~E~~
~~Supervisor Workstation~~	~~N/A~~	~~3~~	~~RT~~ ~~ESF~~ ~~PAMS~~	~~5 min~~ ~~24 hr~~ ~~2 wks~~	~~E~~
~~Switch Station (Including Switches)~~	~~N/A~~	~~3~~	~~RT~~ ~~ESF~~	~~5 min~~ ~~24 hr~~	~~E~~
QDPS Thermocouple Reference Panel 1	PMS-JW-003B	1	PAMS	1 yr	E *
QDPS Thermocouple Reference Panel 2	PMS-JW-003C	1	PAMS	1 yr	E *
MCR/RSW Transfer Switch Panel A	PMS-JW-004A	2	RT ESF	5 min 24 hr	E
MCR/RSW Transfer Switch Panel B	PMS-JW-004B	2	RT ESF	5 min 24 hr	E
MCR/RSW Transfer Switch Panel C	PMS-JW-004C	2	RT ESF	5 min 24 hr	E
MCR/RSW Transfer Switch Panel D	PMS-JW-004D	2	RT ESF	5 min 24 hr	E
Source Range Neutron Flux Preamplifier Panel A	PMS-JW-005A	2	RT, ESF	Note 3	E
Source Range Neutron Flux Preamplifier Panel B	PMS-JW-005B	2	RT, ESF	Note 3	E
Source Range Neutron Flux Preamplifier Panel C	PMS-JW-005C	2	RT, ESF	Note 3	E
Source Range Neutron Flux Preamplifier Panel D	PMS-JW-005D	2	RT, ESF	Note 3	E

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ENVIRONMENTALLY QUALIFIED ELECTRICAL AND MECHANICAL EQUIPMENT

Description	AP1000 Tag No.	Envir. Zone (Note 2)	Function (Note 1)	Operating Time Required (Note 5)	Qualification Program (Note 6)
Intermediate Range Neutron Flux Preamplifier Panel A	PMS-JW-006A	2	RT PAMS	Note 3 4 mos	E
Intermediate Range Neutron Flux Preamplifier Panel B	PMS-JW-006B	2	RT PAMS	Note 3 4 mos	E
Intermediate Range Neutron Flux Preamplifier Panel C	PMS-JW-006C	2	RT PAMS	Note 3 4 mos	E
Intermediate Range Neutron Flux Preamplifier Panel D	PMS-JW-006D	2	RT PAMS	Note 3 4 mos	E
Power Range Neutron Flux High Voltage Distribution Box A	PMS-JW-007A	2	RT	5 min	E
Power Range Neutron Flux High Voltage Distribution Box B	PMS-JW-007B	2	RT	5 min	E
Power Range Neutron Flux High Voltage Distribution Box C	PMS-JW-007C	2	RT	5 min	E
Power Range Neutron Flux High Voltage Distribution Box D	PMS-JW-007D	2	RT	5 min	E
MAIN CONTROL ROOM					
Operator Workstation A	N/A	3	RT ESF PAMS	5 min 24 hr 2 wks	E
Operator Workstation B	N/A	3	RT ESF PAMS	5 min 24 hr 2 wks	E
Supervisor Workstation	N/A	3	RT ESF PAMS	5 min 24 hr 2 wks	E
Switch Station (Including Switches)	N/A	3	RT ESF	5 min 24 hr	E
QDPS MCR Display Unit	PMS JY 001B	3	PAMS	2 wks	E
QDPS MCR Display Unit	PMS JY 001C	3	PAMS	2 wks	E
PENETRATIONS					
Penetrations (Mechanical)	See Table 6.2.3-1				M *
Penetrations (Electrical)	See Figure 3.8.2-4				E *

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ENVIRONMENTALLY QUALIFIED ELECTRICAL AND MECHANICAL EQUIPMENT

Description	AP1000 Tag No.	Envir. Zone (Note 2)	Function (Note 1)	Operating Time Required (Note 5)	Qualification Program (Note 6)
ACTIVE VALVES					
Containment Isolation - Air Out	CAS-PL-V014	2	ESF	5 min	M S
Solenoid Valve	CAS-PL-V014-S	2	ESF	5 min	E
Limit Switch	CAS-PL-V014-L	2	PAMS	2 wks	E
Containment Isolation - Air In	CAS-PL-V015	1	ESF	5 min	M *
Containment Isolation - Inlet	CCS-PL-V200	2	ESF	5 min	M S
Limit Switch	CCS-PL-V200-L	2	PAMS	2 wks	E
Motor Operator	CCS-PL-V200-M	2	ESF	5 min	E
Containment Isolation - Inlet	CCS-PL-V201	1	ESF	5 min	M *
Containment Isolation - Outlet	CCS-PL-V207	1	ESF	5 min	M *
Limit Switch	CCS-PL-V207-L	1	PAMS	1 yr	E *
Motor Operator	CCS-PL-V207-M	1	ESF	5 min	E *
Containment Isolation - Outlet	CCS-PL-V208	2	ESF	5 min	M S
Limit Switch	CCS-PL-V208-L	2	PAMS	2 wks	E
Motor Operator	CCS-PL-V208-M	2	ESF	5 min	E
RCS Purification Stop Valve	CVS-PL-V001	1	ESF	5 min	M *
Limit Switch	CVS-PL-V001-L	1	PAMS	1 yr	E *
Motor Operator	CVS-PL-V001-M	1	ESF	5 min	E *
RCS Purification Stop Valve	CVS-PL-V002	1	ESF	5 min	M *
Limit Switch	CVS-PL-V002-L	1	PAMS	1 yr	E *
Motor Operator	CVS-PL-V002-M	1	ESF	5 min	E *
RCS Letdown Stop Valve	CVS-PL-V003	1	ESF	5 min	M *
Limit Switch	CVS-PL-V003-L	1	PAMS	1 yr	E *
Motor Operator	CVS-PL-V003-M	1	ESF	5 min	E *
Demineralizer Flush Line Relief Valve	CVS-PL-V042	~~1~~ 7	ESF	24 hr	M **
WLS Letdown IRC Isolation	CVS-PL-V045	1	ESF	5 min	M *
Limit Switch	CVS-PL-V045-L	1	PAMS	1 yr	E *
Solenoid Valve	CVS-PL-V045-S	1	ESF	5 min	E *
Letdown Flow ORC Isolation	CVS-PL-V047	7	ESF	5 min	M S **
Limit Switch	CVS-PL-V047-L	7	PAMS	2 wks	E **
Solenoid Valve	CVS-PL-V047-S	7	ESF	5 min	E **

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ENVIRONMENTALLY QUALIFIED ELECTRICAL AND MECHANICAL EQUIPMENT

Description	AP1000 Tag No.	Envir. Zone (Note 2)	Function (Note 1)	Operating Time Required (Note 5)	Qualification Program (Note 6)
RCS Purification Check Valve	CVS-PL-V080	1	ESF	5 min	M *
RCS Purification Stop Valve	CVS-PL-V081	1	ESF	5 min	M *
~~Limit Switch~~	~~CVS-PL-V081-L~~	~~1~~	~~PAMS~~	~~1 yr~~	~~E * +~~
~~Solenoid Valve~~	~~CVS-PL-V081-S~~	~~1~~	~~ESF~~	~~5 min~~	~~E *~~
RCS Purification Check Valve	CVS-PL-V082	1	ESF	5 min	M *
Auxiliary PZR Spray Isolation	CVS-PL-V084	1	ESF	5 min	M *
Limit Switch	CVS-PL-V084-L	1	PAMS	1 yr	E * +
Solenoid Valve	CVS-PL-V084-S	1	ESF	5 min	E *
Auxiliary PZR Spray Isolation	CVS-PL-V085	1	ESF	5 min	M *
Makeup Line Containment Isolation	CVS-PL-V090	7	ESF	5 min	M S **
Limit Switch	CVS-PL-V090-L	7	PAMS	2 wks	E **
Motor Operator	CVS-PL-V090-M	7	ESF	5 min	E **
Makeup Line Containment Isolation	CVS-PL-V091	1	ESF	5 min	M *
Limit Switch	CVS-PL-V091-L	1	PAMS	1 yr	E *
Motor Operator	CVS-PL-V091-M	1	ESF	5 min	E *
Hydrogen Addition Containment Isolation	CVS-PL-V092	10	ESF	5 min	M *
Limit Switch	CVS-PL-V092-L	10	PAMS	2 wks	E *
Solenoid Valve	CVS-PL-V092-S	10	ESF	5 min	E *
Hydrogen Addition Containment Isolation	CVS-PL-V094	1	ESF	5 min	M *
Makeup Containment Isolation	CVS-PL-V100	1	ESF	24 hrs	M *
Demineralizer Water System Isolation	CVS-PL-V136A	7~~6~~	ESF	5 min	M **
Limit Switch	CVS-PL-V136A-L	7~~6~~	PAMS	2 wks	E ** +
Solenoid Valve	CVS-PL-V136A-S	7~~6~~	ESF	5 min	E **
Demineralized Water System Isolation	CVS-PL-V136B	7~~6~~	ESF	5 min	M **
Limit Switch	CVS-PL-V136B-L	7~~6~~	PAMS	2 wks	E ** +
Solenoid Valve	CVS-PL-V136B-S	7~~6~~	ESF	5 min	E **
~~Main to Startup Feed Header (Limit Switch)~~	~~FWS-PL-V097~~	~~8~~	~~PAMS~~	~~2 wks~~	~~E +~~
Fuel Transfer Tube Gate Valve	FHS-PL-V001	11	ESF	2 wks	M **

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ENVIRONMENTALLY QUALIFIED ELECTRICAL AND MECHANICAL EQUIPMENT

Description	AP1000 Tag No.	Envir. Zone (Note 2)	Function (Note 1)	Operating Time Required (Note 5)	Qualification Program (Note 6)
~~Turbine Bypass Control Valve (Limit Switch)~~	~~MSS PL V001L~~	~~8~~	~~PAMS~~	~~2 wks~~	~~E +~~
~~Turbine Bypass Control Valve (Limit Switch)~~	~~MSS PL V002L~~	~~8~~	~~PAMS~~	~~2 wks~~	~~E +~~
~~Turbine Bypass Control Valve (Limit Switch)~~	~~MSS PL V003L~~	~~8~~	~~PAMS~~	~~2 wks~~	~~E +~~
~~Turbine Bypass Control Valve (Limit Switch)~~	~~MSS PL V004L~~	~~8~~	~~PAMS~~	~~2 wks~~	~~E +~~
~~Turbine Bypass Control Valve (Limit Switch)~~	~~MSS PL V005L~~	~~8~~	~~PAMS~~	~~2 wks~~	~~E +~~
~~Turbine Bypass Control Valve (Limit Switch)~~	~~MSS PL V006L~~	~~8~~	~~PAMS~~	~~2 wks~~	~~E +~~
PCCWST Isolation Valve	PCS PL V001A	9	ESF	5 min	M S
Limit Switch	PCS PL V001A-L	9	PAMS	2 wks	E +
Solenoid Valve	PCS PL V001A-S1	9	ESF	5 min	E
PCCWST Isolation Valve	PCS PL V001B	9	ESF	5 min	M S
Limit Switch	PCS PL V001B-L	9	PAMS	2 wks	E +
Solenoid Valve	PCS PL V001B-S1	9	ESF	5 min	E
PCCWST Isolation Valve	PCS PL V001C	9	ESF	5 min	M S
Limit Switch	PCS PL V001C-L	9	PAMS	2 wks	E
Motor Operator	PCS PL V001C-M	9	ESF	5 min	E
PCCWST Isolation Valve	PCS PL V002A	9	ESF	5 min	M S
Limit Switch	PCS PL V002A-L	9	PAMS	2 wks	E
Motor Operator	PCS PL V002A-M	9	ESF	5 min	E
PCCWST Isolation Valve	PCS PL V002B	9	ESF	5 min	M S
Limit Switch	PCS PL V002B-L	9	PAMS	2 wks	E
Motor Operator	PCS PL V002B-M	9	ESF	5 min	E
PCCWST Isolation Valve	PCS PL V002C	9	ESF	5 min	M S
Limit Switch	PCS PL V002C-L	9	PAMS	2 wks	E
Motor Operator	PCS PL V002C-M	9	ESF	5 min	E
PCCWST Fire Protection Isolation	PCS PL V005	10	ESF	72 hrs	M *
PCCWST Emergency Spent Fuel Pool Makeup Isolation	PCS-PL-V009	9	ESF	2 wks	M *
Water Bucket Makeup Line Drain Valve	PCS-PL-V015	10	ESF	2 wks	M *
Water Bucket Makeup Line Isolation Valve	PCS-PL-V020	10	ESF	2 wks	M *
PCS Recirculation Isolation	PCS PL V023	10	ESF	72 hrs	M *

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ENVIRONMENTALLY QUALIFIED ELECTRICAL AND MECHANICAL EQUIPMENT

Description	AP1000 Tag No.	Envir. Zone (Note 2)	Function (Note 1)	Operating Time Required (Note 5)	Qualification Program (Note 6)
PCCWST Long-Term Makeup Check Valve	PCS-PL-V039	10	ESF	2 wks	M *
PCCWST Long Term Makeup Isolation Drain Valve	PCS-PL-V042	10	ESF	2 wks	M *
PCCWST Long Term Makeup Isolation Valve	PCS-PL-V044	10	ESF	2 wks	M *
Emergency Makeup to the Spent Fuel Pool Isolation Valve	PCS-PL-V045	67	ESF	2 wks	M *
PCCWST Recirculation Return Isolation Valve	PCS-PL-V046	10	ESF	2 wks	M *
Emergency Makeup to the Spent Fuel Pool Drain Isolation Valve	PCS-PL-V049	67	ESF	2 wks	M *
Spent Fuel Pool Long Term Makeup Isolation Valve	PCS-PL-V050	10	ESF	2 wks	M *
Spent Fuel Pool Emergency Makeup Lower Isolation Valve	PCS-PL-V051	67	ESF	2 wks	M *
Spent Fuel Pool Emergency Makeup Isolation	PCS-PL-V052	7	ESF	2 wks	M
Containment Isolation - Air Sample Line	PSS PL V008	1	ESF	4 mos	M *
Limit Switch	PSS PL V008-L	1	PAMS	1 yr	E *
Solenoid Operator	PSS PL V008-S	1	ESF	5 min	E *
Containment Isolation - Liquid Sample Line	PSS PL V010A	1	ESF	4 mos	M *
Limit Switch	PSS PL V010A-L	1	PAMS	1 yr	E *
Solenoid Operator	PSS PL V010A-S	1	ESF	5 min	E *
Containment Isolation - Liquid Sample Line	PSS PL V010B	1	ESF	4 mos	M *
Limit Switch	PSS PL V010B-L	1	PAMS	1 yr	E *
Solenoid Operator	PSS PL V010B-S	1	ESF	5 min	E *
Containment Isolation - Liquid Sample Line	PSS PL V011	6	ESF	2 wks	M S**
Limit Switch	PSS PL V011-L	6	PAMS	2 wks	E**
Solenoid Valve	PSS PL V011-S	6	ESF	5 min	E**
Containment Isolation - Sample Return Line	PSS PL V023	6	ESF	2 wks	M S**
Limit Switch	PSS PL V023-L	6	PAMS	2 wks	E**
Solenoid Valve	PSS PL V023-S	6	ESF	5 min	E**
Containment Isolation Sample Return	PSS PL V024	1	ESF	4 mos	M *

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Description	AP1000 Tag No.	Envir. Zone (Note 2)	Function (Note 1)	Operating Time Required (Note 5)	Qualification Program (Note 6)
Containment Isolation - Air Sample Line	PSS PL V046	6	ESF	2 wks	M S**
Limit Switch	PSS PL V046-L	6	PAMS	2 wks	E**
Solenoid Valve	PSS PL V046-S	6	ESF	2 wks	E**
~~Core Makeup Tank A Cold Leg Inlet Isolation~~	~~PXS PL V002A~~	~~1~~	~~ESF~~	~~5 min~~	~~M *~~
~~Limit Switch~~	~~PXS PL V002A-L~~	~~1~~	~~PAMS~~	~~1 yr~~	~~E *~~
~~Motor Operator~~	~~PXS PL V002A-M~~	~~1~~	~~ESF~~	~~5 min~~	~~E *~~
~~Core Makeup Tank B Cold Leg Inlet Isolation~~	~~PXS PL V002B~~	~~1~~	~~ESF~~	~~5 min~~	~~M *~~
~~Limit Switch~~	~~PXS PL V002B-L~~	~~1~~	~~PAMS~~	~~1 yr~~	~~E *~~
~~Motor Operator~~	~~PXS PL V002B-M~~	~~1~~	~~ESF~~	~~5 min~~	~~E *~~
Core Makeup Tank A Discharge Isolation	PXS PL V014A	1	ESF	5 min	M *
Limit Switch	PXS PL V014A-L	1	PAMS	1 yr	E * +
Solenoid Valve	PXS PL V014A-S1	1	ESF	5 min	E *
Core Makeup Tank B Discharge Isolation	PXS PL V014B	1	ESF	5 min	M *
Limit Switch	PXS PL V014B-L	1	PAMS	1 yr	E * +
Solenoid Valve	PXS PL V014B-S1	1	ESF	5 min	E *
Core Makeup Tank A Discharge Isolation	PXS PL V015A	1	ESF	5 min	M *
Limit Switch	PXS PL V015A-L	1	PAMS	1 yr	E * +
Solenoid Valve	PXS PL V015A-S1	1	ESF	5 min	E *
Core Makeup Tank B Discharge Isolation	PXS PL V015B	1	ESF	5 min	M *
Limit Switch	PXS PL V015B-L	1	PAMS	1 yr	E * +
Solenoid Valve	PXS PL V015B-S1	1	ESF	5 min	E *
Core Makeup Tank A Discharge	PXS PL V016A	1	ESF	5 min	M *
Core Makeup Tank B Discharge	PXS PL V016B	1	ESF	5 min	M *
Core Makeup Tank A Discharge	PXS PL V017A	1	ESF	5 min	M *
Core Makeup Tank B Discharge	PXS PL V017B	1	ESF	5 min	M *
Accumulator A Pressure Relief	PXS-PL-V022A	1	ESF	5 min	M *
Accumulator B Pressure Relief	PXS-PL-V022B	1	ESF	5 min	M *
Accumulator A Discharge	PXS PL V028A	1	ESF	5 min	M *
Accumulator B Discharge	PXS PL V028B	1	ESF	5 min	M *
Accumulator A Discharge	PXS PL V029A	1	ESF	5 min	M *
Accumulator B Discharge	PXS PL V029B	1	ESF	5 min	M *
Nitrogen Supply Outside Containment Isolation	PXS PL V042	2	ESF	5 min	M S
Limit Switch	PXS PL V042-L	2	PAMS	2 wks	E
Solenoid Valve	PXS PL V042-S	2	ESF	5 min	E
IRC Nitrogen Supply Inside Containment Isolation	PXS PL V043	1	ESF	5 min	M *
~~PRHR HX Inlet Isolation~~	~~PXS PL V101~~	~~1~~	~~ESF~~	~~5 min~~	~~M *~~
~~Limit Switch~~	~~PXS PL V101-L~~	~~1~~	~~PAMS~~	~~1 yr~~	~~E *~~
~~Motor Operator~~	~~PXS PL V101-M~~	~~1~~	~~ESF~~	~~5 min~~	~~E *~~
PRHR HX Discharge Isolation	PXS PL V108A	1	ESF	5 min	M *
Limit Switch	PXS PL V108A-L	1	PAMS	1 yr	E * +
Solenoid Valve	PXS PL V108A-S1	1	ESF	5 min	E *

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Description	AP1000 Tag No.	Envir. Zone (Note 2)	Function (Note 1)	Operating Time Required (Note 5)	Qualification Program (Note 6)
PRHR HX Discharge Isolation	PXS PL V108B	1	ESF	5 min	M *
Limit Switch	PXS PL V108B-L	1	PAMS	1 yr	E * +
Solenoid Valve	PXS PL V108B-S1	1	ESF	5 min	E *
Recirc Sump A Isolation	PXS PL V117A	1	ESF	24 hr	M *
Limit Switch	PXS PL V117A-L	1	PAMS	1 yr	E *
Motor Operator	PXS PL V117A-M	1	ESF	24 hr	E *
Recirc Sump B Isolation	PXS PL V117B	1	ESF	24 hr	M *
Limit Switch	PXS PL V117B-L	1	PAMS	1 yr	E *
Motor Operator	PXS PL V117B-M	1	ESF	24 hr	E *
Recirc Sump A Isolation	PXS PL V118A	1	ESF	~~24~~ 72 hr	M *
Limit Switch	PXS PL V118A-L	1	PAMS	1 yr	E * +
Squib Operator	PXS PL V118A-T	1	ESF	~~24~~ 72 hr	E *
Recirc Sump B Isolation	PXS PL V118B	1	ESF	~~24~~ 72 hr	M *
Limit Switch	PXS PL V118B-L	1	PAMS	1 yr	E * +
Squib Operator	PXS PL V118B-T	1	ESF	~~24~~ 72 hr	E *
Recirc Sump A	PXS PL V119A	1	ESF	24 hr	M *
Recirc Sump B	PXS PL V119B	1	ESF	24 hr	M *
Recirc Sump A	PXS PL V120A	1	ESF	~~24~~ 72 hr	M *
Limit Switch	PXS PL V120A-L	1	PAMS	1 yr	E * +
Squib Operator	PXS PL V120A-T	1	ESF	~~24~~ 72 hr	E *
Recirc Sump B	PXS PL V120B	1	ESF	~~24~~ 72 hr	M *
Limit Switch	PXS PL V120B-L	1	PAMS	1 yr	E * +
Squib Operator	PXS PL V120B-T	1	ESF	~~24~~ 72 hr	E *
IRWST Injection A	PXS PL V122A	1	ESF	24 hr	M *
IRWST Injection B	PXS PL V122B	1	ESF	24 hr	M *
IRWST Injection A	PXS PL V123A	1	ESF	~~24~~ 72 hr	M *
Limit Switch	PXS PL V123A-L	1	PAMS	1 yr	E * +
Squib Operator	PXS PL V123A-T	1	ESF	~~24~~ 72 hr	E *
IRWST Injection B	PXS PL V123B	1	ESF	~~24~~ 72 hr	M *
Limit Switch	PXS PL V123B-L	1	PAMS	1 yr	E * +
Squib Operator	PXS PL V123B-T	1	ESF	~~24~~ 72 hr	E *
IRWST Injection A	PXS PL V124A	1	ESF	24 hr	M *
IRWST Injection B	PXS PL V124B	1	ESF	24 hr	M *
IRWST Injection A	PXS PL V125A	1	ESF	~~24~~ 72 hr	M *
Limit Switch	PXS PL V125A-L	1	PAMS	1 yr	E * +
Squib Operator	PXS PL V125A-T	1	ESF	~~24~~ 72 hr	E *
IRWST Injection B	PXS PL V125B	1	ESF	~~24~~ 72 hr	M *
Limit Switch	PXS PL V125B-L	1	PAMS	1 yr	E * +
Squib Operator	PXS PL V125B-T	1	ESF	~~24~~ 72 hr	E *
IRWST Gutter Drain Isolation A	PXS-PL-V130A	1	ESF	5 min	M *
Limit Switch	PXS-PL-V130A-L	1	PAMS	1 yr	E *
Solenoid Valve	PXS-PL-V130A-S1	1	ESF	5 min	E *
IRWST Gutter Drain Isolation B	PXS-PL-V130B	1	ESF	5 min	M *
Limit Switch	PXS-PL-V130B-L	1	PAMS	1 yr	E *
Solenoid Valve	PXS-PL-V130B-S1	1	ESF	5 min	E *

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First Stage ADS	RCS PL V001A	1	ESF	24 hr	M *
Limit Switch	RCS PL V001A-L	1	PAMS	1 yr	E *
Motor Operator	RCS PL V001A-M	1	ESF	24 hr	E *
First Stage ADS	RCS PL V001B	1	ESF	24 hr	M *
Limit Switch	RCS PL V001B-L	1	PAMS	1 yr	E *
Motor Operator	RCS PL V001B-M	1	ESF	24 hr	E *

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Description	AP1000 Tag No.	Envir. Zone (Note 2)	Function (Note 1)	Operating Time Required (Note 5)	Qualification Program (Note 6)
Second Stage ADS	RCS PL V002A	1	ESF	24 hr	M *
Limit Switch	RCS PL V002A-L	1	PAMS	1 yr	E *
Motor Operator	RCS PL V002A-M	1	ESF	24 hr	E *
Second Stage ADS	RCS PL V002B	1	ESF	24 hr	M *
Limit Switch	RCS PL V002B-L	1	PAMS	1 yr	E *
Motor Operator	RCS PL V002B-M	1	ESF	24 hr	E *
Third Stage ADS	RCS PL V003A	1	ESF	24 hr	M *
Limit Switch	RCS PL V003A-L	1	PAMS	1 yr	E *
Motor Operator	RCS PL V003A-M	1	ESF	24 hr	E *
Third Stage ADS	RCS PL V003B	1	ESF	24 hr	M *
Limit Switch	RCS PL V003B-L	1	PAMS	1 yr	E *
Motor Operator	RCS PL V003B-M	1	ESF	24 hr	E *
Fourth Stage ADS	RCS PL V004A	1	ESF	~~24~~ 72 hr	M *
Limit Switch	RCS PL V004A-L	1	PAMS	1 yr	E * +
Squib Operator	RCS PL V004A-T	1	ESF	~~24~~ 72 hr	E *
Fourth Stage ADS	RCS PL V004B	1	ESF	~~24~~ 72 hr	M *
Limit Switch	RCS PL V004B-L	1	PAMS	1 yr	E * +
Squib Operator	RCS PL V004B-T	1	ESF	~~24~~ 72 hr	E *
Fourth Stage ADS	RCS PL V004C	1	ESF	~~24~~ 72 hr	M *
Limit Switch	RCS PL V004C-L	1	PAMS	1 yr	E * +
Squib Operator	RCS PL V004C-T	1	ESF	~~24~~ 72 hr	E *
Fourth Stage ADS	RCS PL V004D	1	ESF	~~24~~ 72 hr	M *
Limit Switch	RCS PL V004D-L	1	PAMS	1 yr	E * +
Squib Operator	RCS PL V004D-T	1	ESF	~~24~~ 72 hr	E *
PZR Safety Valve	RCS PL V005A	1	ESF	5 min	M *
~~Limit Switch~~	~~RCS PL V005A-L~~	~~1~~	~~PAMS~~	~~1 yr~~	~~E * +~~
PZR Safety Valve	RCS PL V005B	1	ESF	5 min	M *
~~Limit Switch~~	~~RCS PL V005B-L~~	~~1~~	~~PAMS~~	~~1 yr~~	~~E * +~~
ADS Discharge Header A Relief	RCS PL V010A	1	ESF	24 hr	M *
ADS Discharge Header B Relief	RCS PL V010B	1	ESF	24 hr	M *
First Stage ADS Isolation	RCS PL V011A	1	ESF	24 hr	M *
Limit Switch	RCS PL V011A-L	1	PAMS	1 yr	E *
Motor Operator	RCS PL V011A-M	1	ESF	24 hr	E *
First Stage ADS Isolation	RCS PL V011B	1	ESF	24 hr	M *
Limit Switch	RCS PL V011B-L	1	PAMS	1 yr	E *
Motor Operator	RCS PL V011B-M	1	ESF	24 hr	E *

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Description	AP1000 Tag No.	Envir. Zone (Note 2)	Function (Note 1)	Operating Time Required (Note 5)	Qualification Program (Note 6)
Second Stage ADS Isolation	RCS PL V012A	1	ESF	24 hr	M *
Limit Switch	RCS PL V012A-L	1	PAMS	1 yr	E *
Motor Operator	RCS PL V012A-M	1	ESF	24 hr	E *
Second Stage ADS Isolation	RCS PL V012B	1	ESF	24 hr	M *
Limit Switch	RCS PL V012B-L	1	PAMS	1 yr	E *
Motor Operator	RCS PL V012B-M	1	ESF	24 hr	E *
Third Stage ADS Isolation	RCS PL V013A	1	ESF	24 hr	M *
Limit Switch	RCS PL V013A-L	1	PAMS	1 yr	E *
Motor Operator	RCS PL V013A-M	1	ESF	24 hr	E *
Third Stage ADS Isolation	RCS PL V013B	1	ESF	24 hr	M *
Limit Switch	RCS PL V013B-L	1	PAMS	1 yr	E *
Motor Operator	RCS PL V013B-M	1	ESF	24 hr	E *
~~Fourth Stage ADS Isolation~~	~~RCS V014A~~	~~1~~	~~ESF~~	~~24 hr~~	~~M *~~
~~Limit Switch~~	~~RCS V014A-L~~	~~1~~	~~PAMS~~	~~1 yr~~	~~E *~~
~~Motor Operator~~	~~RCS V014A-M~~	~~1~~	~~ESF~~	~~24 hr~~	~~E *~~
~~Fourth Stage ADS Isolation~~	~~RCS V014B~~	~~1~~	~~ESF~~	~~24 hr~~	~~M *~~
~~Limit Switch~~	~~RCS V014B-L~~	~~1~~	~~PAMS~~	~~1 yr~~	~~E *~~
~~Motor Operator~~	~~RCS V014B-M~~	~~1~~	~~ESF~~	~~24 hr~~	~~E *~~
~~Fourth Stage ADS Isolation~~	~~RCS V014C~~	~~1~~	~~ESF~~	~~24 hr~~	~~M *~~
~~Limit Switch~~	~~RCS V014C-L~~	~~1~~	~~PAMS~~	~~1 yr~~	~~E *~~
~~Motor Operator~~	~~RCS V014C-M~~	~~1~~	~~ESF~~	~~24 hr~~	~~E *~~
~~Fourth Stage ADS Isolation~~	~~RCS V014D~~	~~1~~	~~ESF~~	~~24 hr~~	~~M *~~
~~Limit Switch~~	~~RCS V014D-L~~	~~1~~	~~PAMS~~	~~1 yr~~	~~E *~~
~~Motor Operator~~	~~RCS V014D-M~~	~~1~~	~~ESF~~	~~24 hr~~	~~E *~~
Reactor Vessel Head Vent	RCS-PL V150A	1	ESF	5 min	~~E~~ M *
Limit Switch	RCS-PL V150A-L	1	PAMS	1 yr	E * +
Solenoid Operator	RCS-PL-V150A-S	1	ESF	5 min	E *
Reactor Vessel Head Vent	RCS PL V150B	1	ESF	5 min	~~E~~ M *
Limit Switch	RCS PL V150B-L	1	PAMS	1 yr	E * +
Solenoid Operator	RCS-PL-V150B-S	1	ESF	5 min	E *
Reactor Vessel Head Vent	RCS PL V150C	1	ESF	5 min	~~E~~ M *
Limit Switch	RCS PL V150C-L	1	PAMS	1 yr	E * +
Solenoid Operator	RCS-PL-V150C-S	1	ESF	5 min	E *
Reactor Vessel Head Vent	RCS PL V150D	1	ESF	5 min	~~E~~ M *
Limit Switch	RCS PL V150D-L	1	PAMS	1 yr	E * +
Solenoid Operator	RCS-PL-V150D-S	1	ESF	5 min	E *
RCS Inner Suction Isolation	RNS PL V001A	1	ESF	5 min	M *
Limit Switch	RNS PL V001A-L	1	PAMS	1 yr	E *
Motor Operator	RNS PL V001A-M	1	ESF	5 min	E *
RCS Inner Suction Isolation	RNS PL V001B	1	ESF	5 min	M *
Limit Switch	RNS PL V001B-L	1	PAMS	1 yr	E *
Motor Operator	RNS PL V001B-M	1	ESF	5 min	E *

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ENVIRONMENTALLY QUALIFIED ELECTRICAL AND MECHANICAL EQUIPMENT

Description	AP1000 Tag No.	Envir. Zone (Note 2)	Function (Note 1)	Operating Time Required (Note 5)	Qualification Program (Note 6)
RCS Outer Suction Isolation	RNS PL V002A	1	ESF	5 min	M *
Limit Switch	RNS PL V002A-L	1	PAMS	1 yr	E *
Motor Operator	RNS PL V002A-M	1	ESF	5 min	E *
RCS Outer Suction Isolation	RNS PL V002B	1	ESF	5 min	M *
Limit Switch	RNS PL V002B-L	1	PAMS	1 yr	E *
Motor Operator	RNS PL V002B-M	1	ESF	5 min	E *
RCS Thermal Relief	RNS PL V003A	1	ESF	24 hr	M *
RCS Thermal Relief	RNS PL V003B	1	ESF	24 hr	M *
RHR Control/Isolation Valve	RNS PL V011	6	ESF	5 min	M S **
Limit Switch	RNS PL V011-L	6	PAMS	2 wks	E **
Motor Operator	RNS PL V011-M	6	ESF	5 min	E **
RNS Discharge Containment Isolation	RNS PL V013	1	ESF	5 min	M *
RNS Discharge RCP B Isolation	RNS PL V015A	1	ESF	5 min	M *
RNS Discharge RCP B Isolation	RNS PL V015B	1	ESF	5 min	M *
RNS Discharge RCP B Isolation	RNS PL V017A	1	ESF	5 min	M *
RNS Discharge RCP B Isolation	RNS PL V017B	1	ESF	5 min	M *
RNS Hot Leg Suction Relief	RNS PL V021	1	ESF	24 hr	M *
RHR Pump Suction Header Isolation	RNS PL V022	6	ESF	5 min	M S **
Limit Switch	RNS PL V022-L	6	PAMS	2 wks	E **
Motor Operator	RNS PL V022-M	6	ESF	5 min	E **
IRWST Suction Line Isolation	RNS PL V023	1	ESF	5 min	M *
Limit Switch	RNS PL V023-L	1	PAMS	1 yr	E *
Motor Operator	RNS PL V023-M	1	ESF	5 min	E *
RNS HX A Channel Head Drain	RNS PL V046A	6	ESF	1 yr	M **
RNS - CVS Containment Isolation	RNS PL V061	1	ESF	5 min	M *
Limit Switch	RNS PL V061-L	1	PAMS	1 yr	E *
Motor Operator	RNS PL V061-M	1	ESF	5 min	E *
Containment Isolation	SFS PL V034	1	ESF	5 min	M *
Limit Switch	SFS PL V034-L	1	PAMS	1 yr	E *
Motor Operator	SFS PL V034-M	1	ESF	5 min	E *
Containment Isolation	SFS PL V035	6	ESF	5 min	M S **
Limit Switch	SFS PL V035-L	6	PAMS	2 wks	E **
Motor Operator	SFS PL V035-M	6	ESF	5 min	E **

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Description	AP1000 Tag No.	Envir. Zone (Note 2)	Function (Note 1)	Operating Time Required (Note 5)	Qualification Program (Note 6)
SFS Discharge Containment Isolation	SFS PL V037	1	ESF	5 min	M *
Containment Isolation	SFS PL V038	6	ESF	5 min	M S **
Limit Switch	SFS PL V038-L	6	PAMS	2 wks	E **
Motor Operator	SFS PL V038-M	6	ESF	5 min	E **
Spent Fuel Pool to Cask Washdown Pit Isolation	SFS PL V066	6	ESF	2 wks	M **
Cask Washdown Pit Drain Isolation	SFS PL V068	6	ESF	2 wks	M **
Refueling Cavity to SG Compartment	SFS PL V071	1	ESF	2 wks	M *
Refueling Cavity to SG Compartment	SFS PL V072	1	ESF	2 wks	M *
PORV Block Valve	SGS PL V027A	5	ESF	5 min	M *
Limit Switch	SGS PL V027A-L	5	PAMS	2 wks	E *
Motor Operator	SGS PL V027A-M	5	ESF	5 min	E *
PORV Block Valve	SGS PL V027B	5	ESF	5 min	M *
Limit Switch	SGS PL V027B-L	5	PAMS	2 wks	E *
Motor Operator	SGS PL V027B-M	5	ESF	5 min	E *
Steam Safety Valve SG01	SGS PL V030A	5	ESF	5 min	M *
Limit Switch	SGS PL V030A-L	5	PAMS	2 wks	E * +
Steam Safety Valve SG02	SGS PL V030B	5	ESF	5 min	M *
Limit Switch	SGS PL V030B-L	5	PAMS	2 wks	E * +
Steam Safety Valve SG01	SGS PL V031A	5	ESF	5 min	M *
Limit Switch	SGS PL V031A-L	5	PAMS	2 wks	E * +
Steam Safety Valve SG02	SGS PL V031B	5	ESF	5 min	M *
Limit Switch	SGS PL V031B-L	5	PAMS	2 wks	E * +
Steam Safety Valve SG01	SGS PL V032A	5	ESF	5 min	M *
Limit Switch	SGS PL V032A-L	5	PAMS	2 wks	E * +
Steam Safety Valve SG02	SGS PL V032B	5	ESF	5 min	M *
Limit Switch	SGS PL V032B-L	5	PAMS	2 wks	E * +
Steam Safety Valve SG01	SGS PL V033A	5	ESF	5 min	M *
Limit Switch	SGS PL V033A-L	5	PAMS	2 wks	E * +
Steam Safety Valve SG02	SGS PL V033B	5	ESF	5 min	M *
Limit Switch	SGS PL V033B-L	5	PAMS	2 wks	E * +
Steam Safety Valve SG01	SGS PL V034A	5	ESF	5 min	M *
Limit Switch	SGS PL V034A-L	5	PAMS	2 wks	E * +
Steam Safety Valve SG02	SGS PL V034B	5	ESF	5 min	M *
Limit Switch	SGS PL V034B-L	5	PAMS	2 wks	E * +
Steam Safety Valve SG01	SGS PL V035A	5	ESF	5 min	M *
Limit Switch	SGS PL V035A-L	5	PAMS	2 wks	E * +
Steam Safety Valve SG02	SGS PL V035B	5	ESF	5 min	M *
Limit Switch	SGS PL V035B-L	5	PAMS	2 wks	E * +

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Description	AP1000 Tag No.	Envir. Zone (Note 2)	Function (Note 1)	Operating Time Required (Note 5)	Qualification Program (Note 6)
Steamline Condensate					
Drain Isolation	SGS PL V036A	5	ESF	5 min	M *
Limit Switch	SGS PL V036A-L	5	PAMS	2 wks	E *
Solenoid Valve	SGS PL V036A-S	5	ESF	5 min	E *
Steamline Condensate Isolation	SGS PL V036B	5	ESF	5 min	M *
Limit Switch	SGS PL V036B-L	5	PAMS	2 wks	E *
Solenoid Valve	SGS PL V036B-S	5	ESF	5 min	E *
Main Steamline Isolation	SGS PL V040A	5	ESF	5 min	M *
Limit Switch	SGS PL V040A-L	5	PAMS	2 wks	E *
Solenoid Valve	SGS PL V040A-S1	5	ESF	5 min	E *
Solenoid Valve	SGS PL V040A-S2	5	ESF	5 min	E *
Solenoid Valve	SGS PL V040A-S3	5	ESF	5 min	E *
Solenoid Valve	SGS PL V040A-S4	5	ESF	5 min	E *
Main Steamline Isolation	SGS PL V040B	5	ESF	5 min	M *
Limit Switch	SGS PL V040B-L	5	PAMS	2 wks	E *
Solenoid Valve	SGS PL V040B-S1	5	ESF	5 min	E *
Solenoid Valve	SGS PL V040B-S2	5	ESF	5 min	E *
Solenoid Valve	SGS PL V040B-S3	5	ESF	5 min	E *
Solenoid Valve	SGS PL V040B-S4	5	ESF	5 min	E *
Main Feedwater Isolation	SGS PL V057A	5	ESF	5 min	M *
Limit Switch	SGS PL V057A-L	5	PAMS	2 wks	E *
Solenoid Valve	SGS PL V057A-S1	5	ESF	5 min	E *
Solenoid Valve	SGS PL V057B-S2	5	ESF	5 min	E *
Solenoid Valve	SGS PL V057B-S3	5	ESF	5 min	E *
Solenoid Valve	SGS PL V057B-S4	5	ESF	5 min	E *
Main Feedwater Isolation	SGS PL V057B	5	ESF	5 min	M *
Limit Switch	SGS PL V057B-L	5	PAMS	2 wks	E *
Solenoid Valve	SGS PL V057B-S1	5	ESF	5 min	E *
Solenoid Valve	SGS PL V057B -S2	5	ESF	5 min	E *
Solenoid Valve	SGS PL V057B -S3	5	ESF	5 min	E *
Solenoid Valve	SGS PL V057B -S4	5	ESF	5 min	E *
Startup Feedwater Isolation	SGS PL V067A	5	ESF	5 min	M *
Limit Switch	SGS PL V067A-L	5	PAMS	2 wks	E *
Motor Operator	SGS PL V067A-M	5	ESF	5 min	E *
Startup Feedwater Isolation	SGS PL V067B	5	ESF	5 min	M *
Limit Switch	SGS PL V067B-L	5	PAMS	2 wks	E *
Motor Operator	SGS PL V067B-M	5	ESF	5 min	E *
SG Blowdown Isolation	SGS PL V074A	10	ESF	5 min	M *
Limit Switch	SGS PL V074A-L	10	PAMS	2 wks	E *
Solenoid Valve	SGS PL V074A-S	10	ESF	5 min	E *
SG Blowdown Isolation	SGS PL V074B	10	ESF	5 min	M *
Limit Switch	SGS PL V074B-L	10	PAMS	2 wks	E *
Solenoid Valve	SGS PL V074B-S	10	ESF	5 min	E *
SG Series Blowdown Isolation	SGS PL V075A	10	ESF	5 min	M *
Limit Switch	SGS PL V075A-L	10	PAMS	2 wks	E *
Solenoid Valve	SGS PL V075A-S	10	ESF	5 min	E *

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SG Series Blowdown Isolation	SGS PL V075B	10	ESF	5 min	M *
Limit Switch	SGS PL V075B-L	10	PAMS	2 wks	E *
Solenoid Valve	SGS PL V075B-S	10	ESF	5 min	E *
Steamline Condensate Drain	SGS PL V086A	5	ESF	5 min	M *
Isolation Solenoid Valve	SGS PL V086A-S	5	ESF	5 min	E *
Steamline Condensate Drain	SGS PL V086B	5	ESF	5 min	M *
Isolation Solenoid Valve	SGS PL V086B-S	5	ESF	5 min	E *
Power Operated Relief Valve	SGS PL V233A	5	ESF	5 min	M *
Limit Switch	SGS PL V233A-L	5	PAMS	2 wks	E * +
Solenoid Valve	SGS PL V233A-S	5	ESF	5 min	E *

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Description	AP1000 Tag No.	Envir. Zone (Note 2)	Function (Note 1)	Operating Time Required (Note 5)	Qualification Program (Note 6)
Power Operated Relief Valve	SGS PL V233B	5	ESF	5 min	M *
Limit Switch	SGS PL V233B-L	5	PAMS	2 wks	E * +
Solenoid Valve	SGS PL V233B-S	5	ESF	5 min	E *
MSIV Bypass Isolation Valve	SGS PL V240A	5	ESF	5 min	M *
Limit Switch	SGS PL V240A-L	5	PAMS	2 wks	E *
Solenoid Valve	SGS PL V240A-S1	5	ESF	5 min	E *
Solenoid Valve	SGS PL V240A-S2	5	ESF	5 min	E *
MSIV Bypass Isolation Valve	SGS PL V240B	5	ESF	5 min	M *
Limit Switch	SGS PL V240B-L	5	PAMS	2 wks	E *
Solenoid Valve	SGS PL V240B-S1	5	ESF	5 min	E *
Solenoid Valve	SGS PL V240B-S2	5	ESF	5 min	E *
Main Feedwater Control Valve	SGS PL V250A	5	ESF	5 min	M *
Limit Switch ~~(Closed)~~	SGS PL V250A-L	5	PAMS	2 wks	E * +
Solenoid Valve	SGS PL V250A-S	5	ESF	5 min	E *
Main Feedwater Control Valve	SGS PL V250B	5	ESF	5 min	M *
Limit Switch	SGS PL V250B-L	5	PAMS	2 wks	E * +
Solenoid Valve	SGS PL V250B-S	5	ESF	5 min	E *
Startup Feedwater Control Valve	SGS PL V255A	5	ESF	5 min	M *
Limit Switch	SGS PL V255A-L	5	PAMS	2 wks	E * +
Solenoid Valve	SGS PL V255A-S	5	ESF	5 min	E *
Startup Feedwater Control Valve	SGS PL V255B	5	ESF	5 min	M *
Limit Switch	SGS PL V255B-L	5	PAMS	2 wks	E * +
Solenoid Valve	SGS PL V255B-S	5	ESF	5 min	E *
MCR Isolation Valve	VBS PL V186	3	ESF	24 hr	M
Limit Switch	VBS PL V186-~~S~~L	3	PAMS	2 wks	E+
Solenoid Valve	VBS PL V186-~~L~~S	3	ESF	24 hr	E
MCR Isolation Valve	VBS PL V187	3	ESF	24 hr	M
Limit Switch	VBS PL V187-~~S~~L	3	PAMS	2 wks	E+
Solenoid Valve	VBS PL V187-~~L~~S	3	ESF	24 hr	E
MCR Isolation Valve	VBS PL V188	3	ESF	24 hr	M
Limit Switch	VBS PL V188-~~S~~L	3	PAMS	2 wks	E+
Solenoid Valve	VBS PL V188-~~L~~S	3	ESF	24 hr	E
MCR Isolation Valve	VBS PL V189	3	ESF	24 hr	M
Limit Switch	VBS PL V189-~~S~~L	3	PAMS	2 wks	E+
Solenoid Valve	VBS PL V189-~~L~~S	3	ESF	24 hr	E
MCR Isolation Valve	VBS PL V190	3	ESF	24 hr	M
Limit Switch	VBS PL V190-~~S~~L	3	PAMS	2 wks	E+
Solenoid Valve	VBS PL V190-~~L~~S	3	ESF	24 hr	E
MCR Isolation Valve	VBS PL V191	3	ESF	24 hr	M
Limit Switch	VBS PL V191-~~S~~L	3	PAMS	2 wks	E+
Solenoid Valve	VBS PL V191-~~L~~S	3	ESF	24 hr	E

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Description	AP1000 Tag No.	Envir. Zone (Note 2)	Function (Note 1)	Operating Time Required (Note 5)	Qualification Program (Note 6)
Air Delivery Isolation Valve	VES PL V001	3	ESF	2 wks	M
Pressure Regulator Valve A	VES PL V002A	7	ESF	2 wks	M
Pressure Regulator Valve B	VES PL V002B	7	ESF	2 wks	M
Actuation Valve A	VES PL V005A	~~7~~3	ESF	2 wks	~~E~~M
Limit Switch	VES PL V005 A-L	~~7~~3	PAMS	2 wks	E +
Solenoid Operator	VES-PL-V005A-S	3	ESF	2 wks	E
Actuation Valve B	VES PL V005B	~~7~~3	ESF	2 wks	~~E~~M
Limit Switch	VES PL V005 B-L	~~7~~3	PAMS	2 wks	E +
Solenoid Operator	VES-PL-V005B-S	3	ESF	2 wks	E
Relief Isolation Valve A	VES PL V022A	3	ESF	2 wks	M
Limit Switch	VES PL V022 A-L	3	PAMS	2 wks	E
Solenoid Valve	VES PL V022A-S	3	ESF	2 wks	E
Relief Isolation Valve B	VES PL V022B	3	ESF	2 wks	M
Limit Switch	VES PL V022 B-L	3	PAMS	2 wks	E
Solenoid Valve	VES PL V022B-S	3	ESF	2 wks	E
Air Tank Relief A	VES PL V040A	7	ESF	2 wks	M
Air Tank Relief B	VES PL V040B	7	ESF	2 wks	M
Air Tank Relief A	VES PL V041A	7	ESF	2 wks	M
Air Tank Relief B	VES PL V041B	7	ESF	2 wks	M
~~Main Air Flowpath Isolation Valve~~	~~VES PL V044~~	~~3~~	~~ESF~~	~~2 wks~~	~~M~~
Containment Purge Inlet Isolation	VFS PL V003	7	ESF	5 min	M S
Limit Switch	VFS PL V003-L	7	PAMS	2 wks	E
Solenoid Valve	VFS PL V003-S1	7	ESF	5 min	E
Containment Purge Inlet Isolation	VFS PL V004	1	ESF	5 min	M *
Limit Switch	VFS PL V004-L	1	PAMS	1 yr	E *
Solenoid Valve	VFS PL V004-S1	1	ESF	5 min	E *
Containment Purge Discharge Isolation	VFS PL V009	1	ESF	5 min	M *
Limit Switch	VFS PL V009-L	1	PAMS	1 yr	E *
Solenoid Valve	VFS PL V009-S1	1	ESF	5 min	E *
Containment Purge Discharge Isolation	VFS PL V010	6	ESF	5 min	M S **
Limit Switch	VFS PL V010-L	6	PAMS	2 wks	E **
Solenoid Valve	VFS PL V010-S1	6	ESF	5 min	E **
Fan Cooler Supply Isolation	VWS PL V058	2	ESF	5 min	M S
Limit Switch	VWS PL V058-L	2	PAMS	2 wks	E
Solenoid Valve	VWS PL V058-S	2	ESF	5 min	E
Fan Cooler Supply Isolation	VWS PL V062	1	ESF	5 min	M *

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Description	AP1000 Tag No.	Envir. Zone (Note 2)	Function (Note 1)	Operating Time Required (Note 5)	Qualification Program (Note 6)
Fan Cooler Return Isolation	VWS PL V082	1	ESF	5 min	M *
Limit Switch	VWS PL V082-L	1	PAMS	1 yr	E *
Solenoid Valve	VWS PL V082-S	1	ESF	5 min	E *
Fan Cooler Return Isolation	VWS PL V086	2	ESF	5 min	M S
Limit Switch	VWS PL V086-L	2	PAMS	2 wks	E
Solenoid Valve	VWS PL V086-S	2	ESF	5 min	E
Sump Containment Isolation IRC	WLS PL V055	1	ESF	5 min	M *
Limit Switch	WLS PL V055-L	1	PAMS	1 yr	E *
Solenoid Valve	WLS PL V055-S1	1	ESF	5 min	E *
Sump Containment Isolation ORC	WLS PL V057	7	ESF	5 min	M S**
Limit Switch	WLS PL V057-L	7	PAMS	2 wks	E **
Solenoid Valve	WLS PL V057-S1	7	ESF	5 min	E**
RCDT Gas Containment Isolation	WLS PL V067	1	ESF	5 min	M *
Limit Switch	WLS PL V067-L	1	PAMS	1 yr	E *
Solenoid Valve	WLS PL V067-S	1	ESF	5 min	E *
RCDT Gas Containment Isolation	WLS PL V068	7	ESF	5 min	M S**
Limit Switch	WLS PL V068-L	7	PAMS	2 wks	E **
Solenoid Valve	WLS PL V068-S	7	ESF	5 min	E **
CVS To Sump	WLS PL V071 A	1	ESF	2 wks	M *
PXS A To Sump	WLS PL V071 B	1	ESF	2 wks	M *
PXS B To Sump	WLS PL V071 C	1	ESF	2 wks	M *
CVS To Sump	WLS PL V072 A	1	ESF	2 wks	M *
PXS A To Sump	WLS PL V072 B	1	ESF	2 wks	M *
PXS B To Sump	WLS PL V072 C	1	ESF	2 wks	M *

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Description	AP1000 Tag No.	Envir. Zone (Note 2)	Function (Note 1)	Operating Time Required (Note 5)	Qualification Program (Note 6)
MISCELLANEOUS					
Non-Active Valves					
Containment Penetration Test Connection Isolation	CAS-PL-V027	~~2~~1	PB	1 yr	M*
Service Air Supply Outside Containment Isolation	CAS-PL-V204	2	PB	1 yr	M
Service Air Supply Inside Containment Isolation	CAS-PL-V205	1	PB	1 yr	M *
Containment Penetration Test Connection Isolation	CAS-PL-V219	1	PB	1 yr	M *
Containment Isolation Valve Test Connection - Outlet Line	CCS-PL-V209	1	PB	1 yr	M *
Containment Isolation Valve Test Connection - Inlet Line	CCS-PL-V257	2	PB	1 yr	M
Resin Flush IRC Isolation	CVS-PL-V040	1	PB	1 yr	M *
Resin Flush ORC Isolation	CVS-PL-V041	~~10~~7	PB	1 yr	M **
Letdown PZR Instrument Root	CVS-PL-V046	~~10~~7	PB	1 yr	M **
H2 Mkup Containment Isolation Thermal Relief Valve	CVS-PL-V065	1	PB	1 yr	M *
Hydrogen Add Cont Isolation Test Connection	CVS-PL-V095	1	PB	1 yr	M *
Hydrogen Addition Containment Isolation Test Connection	CVS-PL-V096	1	PB	1 yr	M *
Demin Water Supply Containment Isolation - Outside	DWS-PL-V244	~~2~~10	PB	1 yr	M*
Demin Water Supply Containment Isolation - Inside	DWS-PL-V245	1	PB	1 yr	M *
Containment Penetration Test Connection Isolation	DWS-PL-V248	~~2~~10	PB	1 yr	M*
Fire Water Containment Test Connection Isolation	FPS-PL-V049	10	PB	1 yr	M *
Fire Water Containment Supply Isolation	FPS-PL-V050	10	PB	1 yr	M *
Fire Water Containment Test Connection Isolation	FPS-PL-V051	10	PB	1 yr	M *
Fire Water Containment Supply Isolation - Inside	FPS-PL-V052	1	PB	1 yr	M *
Flow Transmitter FT001 Root Valve	PCS-PL-V010A	9	PB	1 yr	M
Flow Transmitter FT001 Root Valve	PCS-PL-V010B	9	PB	1 yr	M
Flow Transmitter FT002 Root Valve	PCS-PL-V011A	9	PB	1 yr	M
Flow Transmitter FT001 Root Valve	PCS-PL-V011B	9	PB	1 yr	M
Flow Transmitter FT003 Root Valve	PCS-PL-V012A	9	PB	1 yr	M
Flow Transmitter FT003 Root Valve	PCS-PL-V012B	9	PB	1 yr	M
Flow Transmitter FT004 Root Valve	PCS-PL-V013A	9	PB	1 yr	M

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Table 3.11-1 (Sheet 33 of 45)

ENVIRONMENTALLY QUALIFIED ELECTRICAL AND MECHANICAL EQUIPMENT

Description	AP1000 Tag No.	Envir. Zone (Note 2)	Function (Note 1)	Operating Time Required (Note 5)	Qualification Program (Note 6)
Flow Transmitter FT004 Root Valve	PCS-PL-V013B	9	PB	1 yr	M
PCCWST Drain Isolation Valve	PCS-PL-V016	9	PB	1 yr	M
PCCWST Isolation Valve Leakage Detection Drain	PCS-PL-V029	9	PB	1 yr	M
PCCWST Isolation Valve Leakage Detection Crossconn	PCS-PL-V030	9	PB	1 yr	M
PCCWST Level Instrument Root Valve	PCS-PL-V031A	9	PB	1 yr	M
PCCWST Level Instrument Root Valve	PCS-PL-V031B	9	PB	1 yr	M
Recirculation Pump Suction from Long Term Makeup Isolation Valve	PCS-PL-V033	10	ESF	2 wks	M *
~~PCCWST Discharge Line Cross-Connect Isolation Valve~~	~~PCS-PL-V047~~	~~9~~	~~ESF~~	~~2 wks~~	~~M *~~
Hot Leg 1 Sample Isolation	PSS-PL-V001A	1	PB	1 yr	M *
Limit Switch	PSS-PL-V001A-L	1	PAMS	1 yr	E *
Hot Leg 2 Sample Isolation	PSS-PL-V001B	1	PB	1 yr	M *
Limit Switch	PSS-PL-V001B-L	1	PAMS	1 yr	E *
Pressurizer Sample Isolation	PSS-PL-V003	1	PB	1 yr	M *
~~PZR Liquid Isolation~~	~~PSS-PL-V003A~~	~~1~~	~~PB~~	~~1 yr~~	~~M *~~
~~PZR Vapor Space Sample Isolation~~	~~PSS-PL-V003B~~	~~1~~	~~PB~~	~~1 yr~~	~~M *~~
PXS Accumulator Sample Isolation	PSS-PL-V004A	1	PB	1 yr	M *
PXS Accumulator Sample Isolation	PSS-PL-V004B	1	PB	1 yr	M *
PXS CMT A Sample Isolation	PSS-PL-V005A	1	PB	1 yr	M *
PXS CMT B Sample Isolation	PSS-PL-V005B	1	PB	1 yr	M *
PXC CMT A Sample Isolation	PSS-PL-V005C	1	PB	1 yr	M *
PXS CMT B Sample Isolation	PSS-PL-V005D	1	PB	1 yr	M *
~~CVS Demineralizer Sample Isolation~~	~~PSS-PL-V006~~	~~1~~	~~PB~~	~~1 yr~~	~~M *~~
Liquid Sample Check Valve	PSS-PL-V012A	1	PB	1 yr	M *
Liquid Sample Check Valve	PSS-PL-V012B	1	PB	1 yr	M *
~~PXS Accumulator A Sample Check Valve~~	~~PSS-PL-V020A~~	~~1~~	~~PB~~	~~1 yr~~	~~M *~~
~~PXS Accumulator B Sample Check Valve~~	~~PSS-PL-V020B~~	~~1~~	~~PB~~	~~1 yr~~	~~M *~~
~~CVS Demineralizer Sample Check Valve~~	~~PSS-PL-V035~~	~~1~~	~~PB~~	~~1 yr~~	~~M *~~
~~WLS Sump Sample Check Valve~~	~~PSS-PL-V039~~	~~1~~	~~PB~~	~~1 yr~~	~~M *~~
Containment Testing Boundary Isolation Valve	PSS-PL-V076A	1	PB	1 yr	M *
Containment Testing Boundary Isolation Valve	PSS-PL-V076B	1	PB	1 yr	M *
Containment Isolation Test Connection Isolation Valve	PSS-PL-V082	1	PB	1 yr	M *
Containment Isolation Test Connection Isolation Valve	PSS-PL-V083	1	PB	1 yr	M *

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ENVIRONMENTALLY QUALIFIED ELECTRICAL AND MECHANICAL EQUIPMENT

Description	AP1000 Tag No.	Envir. Zone (Note 2)	Function (Note 1)	Operating Time Required (Note 5)	Qualification Program (Note 6)
Containment Isolation Test Connection Isolation Valve	PSS-PL-V085	1	PB	1 yr	M *
Containment Isolation Test Connection Isolation Valve	PSS-PL-V086	1	PB	1 yr	M *
MCR Potable Water Inlet Check Valve	PWS-PL-V418	3	PB	1 yr	M
PWS MCR Isolation Valve	PWS-PL-V420	3	PB	1 yr	M
Core Makeup Tank A CL Inlet Isolation	PXS-PL-V002A	1	PB	1 yr	M *
Limit Switch	PXS-PL-V002A-L	1	PAMS	1 yr	E *
Motor Operator	PXS-PL-V002A-M	1	ESF	5 min	E *
Core Makeup Tank B CL Inlet Isolation	PXS-PL-V002B	1	PB	1 yr	M *
Limit Switch	PXS-PL-V002B-L	1	PAMS	1 yr	E *
Motor Operator	PXS-PL-V002B-M	1	ESF	5 min	E *
Core Makeup Tank A Upper Sample	PXS-PL-V010A	1	PB	1 yr	M *
Core Makeup Tank B Upper Sample	PXS-PL-V010B	1	PB	1 yr	M *
Core Makeup Tank A Lower Sample	PXS-PL-V011A	1	PB	1 yr	M *
Core Makeup Tank B Lower Sample	PXS-PL-V011B	1	PB	1 yr	M *
Core Makeup Tank A Drain	PXS-PL-V012A	1	PB	1 yr	M *
Core Makeup Tank B Drain	PXS-PL-V012B	1	PB	1 yr	M *
Core Makeup Tank Discharge Manual Isolation	PXS-PL-V013A	1	PB	1 yr	M *
Core Makeup Tank B Discharge Manual Isolation	PXS-PL-V013B	1	PB	1 yr	M *
Accumulator A N_2 Vent	PXS-PL-V021A	1	PB	1 yr	M *
Accumulator B N_2 Vent	PXS-PL-V021B	1	PB	1 yr	M *
Accumulator A PZR Transmitter Isolation	PXS-PL-V023A	1	PB	1 yr	M *
Accumulator B PZR Transmitter Isolation	PXS-PL-V023B	1	PB	1 yr	M *
Accumulator A PZR Transmitter Isolation	PXS-PL-V024A	1	PB	1 yr	M *
Accumulator B PZR Transmitter Isolation	PXS-PL-V024B	1	PB	1 yr	M *
Accumulator A Sample	PXS-PL-V025A	1	PB	1 yr	M *
Accumulator B Sample	PXS-PL-V025B	1	PB	1 yr	M *
Accumulator A Drain	PXS-PL-V026A	1	PB	1 yr	M *
Accumulator B Drain	PXS-PL-V026B	1	PB	1 yr	M *
Accumulator A Discharge Isolation	PXS-PL-V027A	1	PB	1 yr	M *
Accumulator B Discharge Isolation	PXS-PL-V027B	1	PB	1 yr	M *
Core Makeup Tank A Highpoint Vent	PXS-PL-V030A	1	PB	1 yr	M *
Core Makeup Tank B Highpoint Vent	PXS-PL-V030B	1	PB	1 yr	M *
Core Makeup Tank A Highpoint Vent	PXS-PL-V031A	1	PB	1 yr	M *
Core Makeup Tank B Highpoint Vent	PXS-PL-V031B	1	PB	1 yr	M *

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Accumulator A Check Valve Drain	PXS-PL-V033A	1	PB	1 yr	M *
Accumulator B Check Valve Drain	PXS-PL-V033B	1	PB	1 yr	M *
Accumulator N_2 Containment Penetration Test Connection	PXS-PL-V052	1	PB	1 yr	M *

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ENVIRONMENTALLY QUALIFIED ELECTRICAL AND MECHANICAL EQUIPMENT

Description	AP1000 Tag No.	Envir. Zone (Note 2)	Function (Note 1)	Operating Time Required (Note 5)	Qualification Program (Note 6)
CMT A Wide Level Upper Root	PXS-PL-V080A	1	PB	1 yr	M *
CMT B Wide Level Upper Root	PXS-PL-V080B	1	PB	1 yr	M *
CMT A Wide Level Lower Root	PXS-PL-V081A	1	PB	1 yr	M *
CMT B Wide Level Lower Root	PXS-PL-V081B	1	PB	1 yr	M *
CMT A Level ADS 1 Upper Root	PXS-PL-V085A	1	PB	1 yr	M *
CMT B Level ADS 1 Upper Root	PXS-PL-V085B	1	PB	1 yr	M *
CMT A Level ADS 1 Lower Root	PXS-PL-V086A	1	PB	1 yr	M *
CMT B Level ADS 1 Lower Root	PXS-PL-V086B	1	PB	1 yr	M *
CMT A Level ADS 4 Upper Root	PXS-PL-V087A	1	PB	1 yr	M *
CMT B Level ADS 4 Upper Root	PXS-PL-V087B	1	PB	1 yr	M *
CMT A Level ADS 4 Lower Root	PXS-PL-V088A	1	PB	1 yr	M *
CMT B Level ADS 4 Lower Root	PXS-PL-V088B	1	PB	1 yr	M *
PRHR HX Inlet Isolation	PXS-PL-V101	1	PB	1 yr	M *
Limit Switch	PXS-PL-V101-L	1	PAMS	1 yr	E *
Motor Operator	PXS-PL-V101-M	1	ESF	5 min	E *
PRHR HX Inlet Head Vent	PXS-PL-V102A	1	PB	1 yr	M *
PRHR HX Inlet Head Drain	PXS-PL-V102B	1	PB	1 yr	M *
PRHR HX Outlet Head Vent	PXS-PL-V103A	1	PB	1 yr	M *
PRHR HX Outlet Head Drain	PXS-PL-V103B	1	PB	1 yr	M *
PRHR HX Flow Transmitter A Isolation	PXS-PL-V104A	1	PB	1 yr	M *
PRHR HX Flow Transmitter B Isolation	PXS-PL-V104B	1	PB	1 yr	M *
PRHR HX Flow Transmitter A Isolation	PXS-PL-V105A	1	PB	1 yr	M *
PRHR HX Flow Transmitter B Isolation	PXS-PL-V105B	1	PB	1 yr	M *
PRHR HX/RCS Return Isolation	PXS-PL-V109	1	PB	1 yr	M *
PRHR HX Highpoint Vent	PXS-PL-V111A	1	PB	1 yr	M *
PRHR HX Highpoint Vent	PXS-PL-V111B	1	PB	1 yr	M *
PRHR HX PZR Transmitter Isolation	PXS-PL-V113	1	PB	1 yr	M *
IRWST Line A Isolation	PXS-PL-V121A	1	PB	1 yr	M *
IRWST Line B Isolation	PXS-PL-V121B	1	PB	1 yr	M *
IRWST Injection Check Test	PXS-PL-V126A	1	PB	1 yr	M *
IRWST Injection Check Test	PXS-PL-V126B	1	PB	1 yr	M *
~~IRWST to Containment Sump~~	~~PXS-PL-V127~~	~~1~~	~~PB~~	~~1 yr~~	~~M *~~
IRWST Injection Check Test	PXS-PL-V128A	1	PB	1 yr	M *
IRWST Injection Check Test	PXS-PL-V128B	1	PB	1 yr	M *
IRWST Injection Check Test	PXS-PL-V129A	1	PB	1 yr	M *
IRWST Injection Check Test	PXS-PL-V129B	1	PB	1 yr	M *
IRWST Level Transmitter A Isolation	PXS-PL-V150A	1	PB	1 yr	M *
IRWST Level Transmitter B Isolation	PXS-PL-V150B	1	PB	1 yr	M *
IRWST Level Transmitter C	PXS-PL-V150C	1	PB	1 yr	M *

Isolation					
IRWST Level Transmitter D Isolation	PXS-PL-V150D	1	PB	1 yr	M *
IRWST Level Transmitter A Isolation	PXS-PL-V151A	1	PB	1 yr	M *
IRWST Level Transmitter B Isolation	PXS-PL-V151B	1	PB	1 yr	M *
IRWST Level Transmitter C Isolation	PXS-PL-V151C	1	PB	1 yr	M *
IRWST Level Transmitter D Isolation	PXS-PL-V151D	1	PB	1 yr	M *

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Description	AP1000 Tag No.	Envir. Zone (Note 2)	Function (Note 1)	Operating Time Required (Note 5)	Qualification Program (Note 6)
Accumulator A Leak Test	PXS-PL-V201A	1	PB	1 yr	M *
Accumulator B Leak Test	PXS-PL-V201B	1	PB	1 yr	M *
Accumulator A Leak Test	PXS-PL-V202A	1	PB	1 yr	M *
Accumulator B Leak Test	PXS-PL-V202B	1	PB	1 yr	M *
RNS Discharge Leak Test	PXS-PL-V205A	1	PB	1 yr	M *
RNS Discharge Leak Test	PXS-PL-V205B	1	PB	1 yr	M *
RNS Discharge Leak Test	PXS-PL-V206	1	PB	1 yr	M *
RNS Suction Leak Test	PXS-PL-V207A	1	PB	1 yr	M *
RNS Suction Leak Test	PXS-PL-V207B	1	PB	1 yr	M *
RNS Suction Leak Test	PXS-PL-V208A	1	PB	1 yr	M *
Core Makeup Tank A Fill Isolation	PXS-PL-V230A	1	PB	1 yr	M *
Core Makeup Tank B Fill Isolation	PXS-PL-V230B	1	PB	1 yr	M *
Core Makeup Tank A Fill Check	PXS-PL-V231A	1	PB	1 yr	M *
Core Makeup Tank B Fill Check	PXS-PL-V231B	1	PB	1 yr	M *
Accumulator A Fill/Drain Isolation	PXS-PL-V232A	1	PB	1 yr	M *
Accumulator B Fill/Drain Isolation	PXS-PL-V232B	1	PB	1 yr	M *
ADS Test Valve	RCS-PL-V007A	1	PB	1 yr	M *
ADS Test Valve	RCS-PL-V007B	1	PB	1 yr	M *
Fourth Stage ADS Isolation	RCS-PL-V014A	1	PB	1 yr	M *
Limit Switch	RCS-PL-V014A-L	1	PAMS	1 yr	E *
Motor Operator	RCS-PL-V014A-M	1	ESF	5 min	E *
Fourth Stage ADS Isolation	RCS-PL-V014B	1	PB	1 yr	M *
Limit Switch	RCS-PL-V014B-L	1	PAMS	1 yr	E *
Motor Operator	RCS-PL-V014B-M	1	ESF	5 min	E *
Fourth Stage ADS Isolation	RCS-PL-V014C	1	PB	1 yr	M *
Limit Switch	RCS-PL-V014C-L	1	PAMS	1 yr	E *
Motor Operator	RCS-PL-V014C-M	1	ESF	5 min	E *
Fourth Stage ADS Isolation	RCS-PL-V014D	1	PB	1 yr	M *
Limit Switch	RCS-PL-V014D-L	1	PAMS	1 yr	E *
Motor Operator	RCS-PL-V014D-M	1	ESF	5 min	E *
Hot Leg 2 Level Instrument Root	RCS-PL-V095	1	PB	1 yr	M *
Hot Leg 2 Level Instrument Root	RCS-PL-V096	1	PB	1 yr	M *
Hot Leg 1 Level Instrument Root	RCS-PL-V097	1	PB	1 yr	M *
Hot Leg 1 Level Instrument Root	RCS-PL-V098	1	PB	1 yr	M *
Hot ~~Cold~~ Leg 1~~A~~ Flow ~~Meter~~ Instrument Root	RCS-PL-V101A	1	PB	1 yr	M *
Hot ~~Cold~~ Leg 1~~A~~ Flow ~~Meter~~ Instrument Root	RCS-PL-V101B	1	PB	1 yr	M *
Hot ~~Cold~~ Leg 1~~A~~ Flow ~~Meter~~ Instrument Root	RCS-PL-V101C	1	PB	1 yr	M *
Hot ~~Cold~~ Leg 1~~A~~ Flow ~~Meter~~ Instrument Root	RCS-PL-V101D	1	PB	1 yr	M *
Hot ~~Cold~~ Leg 1~~B~~ Flow ~~Meter~~ Instrument Root	RCS-PL-V101E	1	PB	1 yr	M *
Hot Leg 1 Flow Instrument Root	RCS-PL-V101F	1	PB	1 yr	M *
Hot ~~Cold~~ Leg ~~1B~~ 2 Flow ~~Meter~~ Instrument Root	RCS-PL-V102A	1	PB	1 yr	M *

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Hot ~~Cold~~ Leg ~~1B~~ 2 Flow ~~Meter~~ Instrument Root	RCS-PL-V102B	1	PB	1 yr	M *
Hot ~~Cold~~ Leg ~~1B~~ 2 Flow ~~Meter~~ Instrument Root	RCS-PL-V102C	1	PB	1 yr	M *
Hot ~~Cold~~ Leg ~~1B~~ 2 Flow ~~Meter~~ Instrument Root	RCS-PL-V102D	1	PB	1 yr	M *
Hot ~~Cold~~ Leg ~~2A~~ 2 Flow ~~Meter~~ Instrument Root	RCS-PL-V102E	1	PB	1 yr	M *
Hot Leg 2 Flow Instrument Root	RCS-PL-V102F	1	PB	1 yr	M *

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ENVIRONMENTALLY QUALIFIED ELECTRICAL AND MECHANICAL EQUIPMENT

Description	AP1000 Tag No.	Envir. Zone (Note 2)	Function (Note 1)	Operating Time Required (Note 5)	Qualification Program (Note 6)
~~Cold Leg 2A Flow Meter Instrument Root~~	~~RCS-PL-V103A~~	~~1~~	~~PB~~	~~1 yr~~	~~M *~~
~~Cold Leg 2A Flow Meter Instrument Root~~	~~RCS-PL-V103B~~	~~1~~	~~PB~~	~~1 yr~~	~~M *~~
~~Cold Leg 2A Flow Meter Instrument Root~~	~~RCS-PL-V103C~~	~~1~~	~~PB~~	~~1 yr~~	~~M *~~
~~Cold Leg 2A Flow Meter Instrument Root~~	~~RCS-PL-V103D~~	~~1~~	~~PB~~	~~1 yr~~	~~M *~~
~~Cold Leg 2A Flow Meter Instrument Root~~	~~RCS-PL-V103E~~	~~1~~	~~PB~~	~~1 yr~~	~~M *~~
~~Cold Leg 2B Flow Meter Instrument Root~~	~~RCS-PL-V104A~~	~~1~~	~~PB~~	~~1 yr~~	~~M *~~
~~Cold Leg 2B Flow Meter Instrument Root~~	~~RCS-PL-V104B~~	~~1~~	~~PB~~	~~1 yr~~	~~M *~~
~~Cold Leg 2B Flow Meter Instrument Root~~	~~RCS-PL-V104C~~	~~1~~	~~PB~~	~~1 yr~~	~~M *~~
~~Cold Leg 2B Flow Meter Instrument Root~~	~~RCS-PL-V104D~~	~~1~~	~~PB~~	~~1 yr~~	~~M *~~
~~Cold Leg 2B Flow Meter Instrument Root~~	~~RCS-PL-V104E~~	~~1~~	~~PB~~	~~1 yr~~	~~M *~~
Hot Leg 1 Sample Isolation	RCS-PL-V108A	1	PB	1 yr	M *
Hot Leg 2 Sample Isolation	RCS-PL-V108B	1	PB	1 yr	M *
PZR Spray Valve	RCS-PL-V110A	1	PB	1 yr	M *
PZR Spray Valve	RCS-PL-V110B	1	PB	1 yr	M *
PZR Spray Block Valve	RCS-PL-V111A	1	PB	1 yr	M *
PZR Spray Block Valve	RCS-PL-V111B	1	PB	1 yr	M *
Cold Leg 1A Bend Instrument Root	RCS-PL-V171A	1	PB	1 yr	M *
Cold Leg 1A Bend Instrument Root	RCS-PL-V171B	1	PB	1 yr	M *
Cold Leg 1B Bend Instrument Root	RCS-PL-V172A	1	PB	1 yr	M *
Cold Leg 1B Bend Instrument Root	RCS-PL-V172B	1	PB	1 yr	M *
Cold Leg 2A Bend Instrument Root	RCS-PL-V173A	1	PB	1 yr	M *
Cold Leg 2A Bend Instrument Root	RCS-PL-V173B	1	PB	1 yr	M *
Cold Leg 2B Bend Instrument Root	RCS-PL-V174A	1	PB	1 yr	M *
Cold Leg 2B Bend Instrument Root	RCS-PL-V174B	1	PB	1 yr	M *
~~PZR Steam Space Sample Isolation~~	~~RCS-PL-V203~~	~~1~~	~~PB~~	~~1 yr~~	~~M *~~
PZR Manual Vent	RCS-PL-V204	1	PB	1 yr	M *
PZR Manual Vent	RCS-PL-V205	1	PB	1 yr	M *
PZR Spray Bypass	RCS-PL-V210A	1	PB	1 yr	M *
PZR Spray Bypass	RCS-PL-V210B	1	PB	1 yr	M *
PZR Level Steam Space Instrument Root	RCS-PL-V225A	1	PB	1 yr	M *
PZR Level Steam Space Instrument Root	RCS-PL-V225B	1	PB	1 yr	M *
PZR Level Steam Space Instrument Root	RCS-PL-V225C	1	PB	1 yr	M *
PZR Level Steam Space					

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Instrument Root	RCS-PL-V225D	1	PB	1 yr	M *
PZR Level Liquid Space Instrument Root	RCS-PL-V226A	1	PB	1 yr	M *
PZR Level Liquid Space Instrument Root	RCS-PL-V226B	1	PB	1 yr	M *

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Description	AP1000 Tag No.	Envir. Zone (Note 2)	Function (Note 1)	Operating Time Required (Note 5)	Qualification Program (Note 6)
PZR Level Liquid Space Instrument Root	RCS-PL-V226C	1	PB	1 yr	M *
PZR Level Liquid Space Instrument Root	RCS-PL-V226D	1	PB	1 yr	M *
Wide Range PZR Level Steam Space Instrument Root	RCS-PL-V228	1	PB	1 yr	M *
Wide Range PZR Level Liquid Space Instrument Root	RCS-PL-V229	1	PB	1 yr	M *
Manual Head Vent	RCS-PL-V232	1	PB	1 yr	M *
Head Vent Isolation	RCS-PL-V233	1	PB	1 yr	M *
ADS Valve Discharge Header Drain Isolation	RCS-PL-V241	1	PB	1 yr	M *
RCP 1A Flush	RCS-PL-V260A	1	PB	1 yr	M *
RCP 1B Flush	RCS-PL-V260B	1	PB	1 yr	M *
RCP 2A Flush	RCS-PL-V260C	1	PB	1 yr	M *
RCP 2B Flush	RCS-PL-V260D	1	PB	1 yr	M *
RCP 1A Drain	RCS-PL-V261A	1	PB	1 yr	M *
RCP 1B Drain	RCS-PL-V261B	1	PB	1 yr	M *
RCP 2A Drain	RCS-PL-V261C	1	PB	1 yr	M *
RCP 2B Drain	RCS-PL-V261D	1	PB	1 yr	M *
RCS Pressure Boundary Valve Thermal Relief Isolation	RNS-PL-V004A	1	PB	1 yr	M *
RCS Pressure Boundary Valve Thermal Relief Isolation	RNS-PL-V004B	1	PB	1 yr	M *
RNS Pump A Suction Isolation	RNS-PL-V005A	6	PB	1 yr	M **
RNS Pump B Suction Isolation	RNS-PL-V005B	6	PB	1 yr	M **
RNS HX A Outlet Flow Control	RNS-PL-V006A	6	PB	1 yr	M **
RNS HX B Outlet Flow Control	RNS-PL-V006B	6	PB	1 yr	M **
RNS Pump A Discharge Isolation	RNS-PL-V007A	6	PB	1 yr	M **
RNS Pump B Discharge Isolation	RNS-PL-V007B	6	PB	1 yr	M **
RNS HX A Bypass Flow Control	RNS-PL-V008A	6	PB	1 yr	M **
RNS HX B Bypass Flow Control	RNS-PL-V008B	6	PB	1 yr	M **
RNS Discharge Containment Isolation Valve Test	RNS-PL-V010	6	PB	1 yr	M **
RNS Discharge Containment Isolation Valve Test Connection, ORC	RNS-PL-V012	~~1~~6	PB	1 yr	M **
RNS Discharge Containment Isolation Valve Test Connection	RNS-PL-V014	1	PB	1 yr	M *
RNS Discharge Containment Penetration Isolation Valves Test	RNS-PL-V016	1	PB	1 yr	M *
~~RNS Containment Isolation Test - Pump Suction, ORC~~	~~RNS-PL-V018~~	~~6~~	~~PB~~	~~1 yr~~	~~M~~
RNS Discharge to IRWST Isolation	RNS-PL-V024	1	PB	1 yr	M *
RNS Discharge to CVS	RNS-PL-V029	1	PB	1 yr	M *
RNS Train A Discharge Flow					

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Instrument Isolation	RNS-PL-V031A	6	PB	1 yr	M **
RNS Train B Discharge Flow Instrument Isolation	RNS-PL-V031B	6	PB	1 yr	M **

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ENVIRONMENTALLY QUALIFIED ELECTRICAL AND MECHANICAL EQUIPMENT

Description	AP1000 Tag No.	Envir. Zone (Note 2)	Function (Note 1)	Operating Time Required (Note 5)	Qualification Program (Note 6)
RNS Train A Discharge Flow Instrument Isolation	RNS-PL-V032A	6	PB	1 yr	M**
RNS Train B Discharge Flow Instrument Isolation	RNS-PL-V032B	6	PB	1 yr	M**
RNS Pump A Suction Pressure Instrument Isolation	RNS-PL-V033A	6	PB	1 yr	M**
RNS Pump B Suction Pressure Instrument Isolation	RNS-PL-V033B	6	PB	1 yr	M**
RNS Pump A Discharge Pressure Instrument Isolation	RNS-PL-V034A	6	PB	1 yr	M**
RNS Pump B Discharge Pressure Instrument Isolation	RNS-PL-V034B	6	PB	1 yr	M**
RNS Pump A Suction Piping Drain Isolation	RNS-PL-V036A	6	PB	1 yr	M**
RNS Pump B Suction Piping Drain Isolation	RNS-PL-V036B	6	PB	1 yr	M**
RNS Pump Discharge Relief	RNS-PL-V045	6	PB	1 yr	M**
RNS HX B Channel Head Drain Isolation	RNS-PL-~~V048~~V046B	6	PB	1 yr	M**
RNS Pump A Casing Drain Isolation	RNS-PL-V050	6	PB	1 yr	M**
RNS Pump B Casing Drain Isolation	RNS-PL-V051	6	PB	1 yr	M**
RNS Suction from SFP Isolation	RNS-PL-V052	6	PB	1 yr	M**
RNS Discharge to SFP Isolation	RNS-PL-V053	6	PB	1 yr	M**
RNS Suction from Cask Loading Pit Isolation Valve	RNS-PL-V055	6	PB	1 yr	M**
RNS Pump Suction to Cask Loading Pit Isolation	RNS-PL-V056	6	PB	1 yr	M**
RNS Train A Miniflow Isolation Valve	RNS-PL-V057A	6	PB	1 yr	M**
RNS Train B Miniflow Isolation Valve	RNS-PL-V057B	6	PB	1 yr	M**
RNS Pump Suction Containment Isolation Test Connection	RNS-PL-V059	6	PB	1 yr	M**
LT019A Root Isolation Valve	SFS-PL-V024A	6	PB	1 yr	M**
LT019B Root Isolation Valve	SFS-PL-V024B	6	PB	1 yr	M**
LT019C Root Isolation Valve	SFS-PL-V024C	6	PB	1 yr	M**
LT020 Root Isolation Valve	SFS-PL-V028	6	PB	1 yr	M**
SFS Refueling Cavity Drain To SGS Compartment Isolation	SFS-PL-V031	1	PB	1 yr	M*
SFS Refueling Cavity Suction Isolation	SFS-PL-V032	1	PB	1 yr	M*
SFS Refueling Cavity Drain to Containment Sump Isolation	SFS-PL-V033	1	PB	1 yr	M*
SFS Suction Line from IRWST Isolation	SFS-PL-V039	1	PB	1 yr	M*
SFS Fuel Transfer Canal Suction Isolation	SFS-PL-V040	6	PB	1 yr	M**
SFS Cask Loading Pit Suction Isolation	SFS-PL-V041	6	PB	1 yr	M**

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SFS Cask Loading Pit to Pumps Suction Isolation	SFS-PL-V042	6	PB	1 yr	M **
SFS CVS Makeup Reverse Flow Prevention	SFS-PL-V043	6	PB	1 yr	M **
SFS Discharge Line to Cask Loading Pit Isolation	SFS-PL-V045	6	PB	1 yr	M **
~~SFS Demin Water Makeup to SFP Rev Flow Prevent~~	~~SFS-PL-V047~~	~~6~~	~~PB~~	~~1 yr~~	~~M~~
SFS Containment Penetration Test Connection	SFS-PL-V048	6	PB	1 yr	M **

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Table 3.11-1 (Sheet 40 of 45)

ENVIRONMENTALLY QUALIFIED ELECTRICAL AND MECHANICAL EQUIPMENT

Description	AP1000 Tag No.	Envir. Zone (Note 2)	Function (Note 1)	Operating Time Required (Note 5)	Qualification Program (Note 6)
SFS Cask Loading Pit Drain to WLS Isolation	SFS-PL-V049	6	PB	1 yr	M**
SFS Containment Penetration Test Connection Isolation	SFS-PL-V056	1	PB	1 yr	M *
SFS Containment Isolation Valve V034 Test	SFS-PL-V058	1	PB	1 yr	M *
LT001 Root Isolation Valve	SGS-PL-V001A	1	PB	1 yr	M *
LT005 Root Isolation Valve	SGS-PL-V001B	1	PB	1 yr	M *
LT001 Root Isolation Valve	SGS-PL-V002A	1	PB	1 yr	M *
LT005 Root Isolation Valve	SGS-PL-V002B	1	PB	1 yr	M *
LT002 Root Isolation Valve	SGS-PL-V003A	1	PB	1 yr	M *
LT006 Root Isolation Valve	SGS-PL-V003B	1	PB	1 yr	M *
LT002 Root Isolation Valve	SGS-PL-V004A	1	PB	1 yr	M *
LT006 Root Isolation Valve	SGS-PL-V004B	1	PB	1 yr	M *
LT003 Root Isolation Valve	SGS-PL-V005A	1	PB	1 yr	M *
LT007 Root Isolation Valve	SGS-PL-V005B	1	PB	1 yr	M *
LT003 Root Isolation Valve	SGS-PL-V006A	1	PB	1 yr	M *
LT007 Root Isolation Valve	SGS-PL-V006B	1	PB	1 yr	M *
LT004 Root Isolation Valve	SGS-PL-V007A	1	PB	1 yr	M *
LT008 Root Isolation Valve	SGS-PL-V007B	1	PB	1 yr	M *
LT004 Root Isolation Valve	SGS-PL-V008A	1	PB	1 yr	M *
LT008 Root Isolation Valve	SGS-PL-V008B	1	PB	1 yr	M *
LT011 Root Isolation Valve	SGS-PL-V010A	1	PB	1 yr	M*
LT013 Root Isolation Valve	SGS-PL-V010B	1	PB	1 yr	M *
LT011 Root Isolation Valve	SGS-PL-V011A	1	PB	1 yr	M *
LT013 Root Isolation Valve	SGS-PL-V011B	1	PB	1 yr	M *
LT012 Root Isolation Valve	SGS-PL-V012A	1	PB	1 yr	M *
LT014 Root Isolation Valve	SGS-PL-V012B	1	PB	1 yr	M *
LT012 Root Isolation Valve	SGS-PL-V013A	1	PB	1 yr	M *
LT014 Root Isolation Valve	SGS-PL-V013B	1	PB	1 yr	M *
FT021 Root Isolation Valve	SGS-PL-V015A	1	PB	1 yr	M *
FT023 Root Isolation Valve	SGS-PL-V015B	1	PB	1 yr	M *
FT020 Root Isolation Valve	SGS-PL-V016A	1	PB	1 yr	M *
FT022 Root Isolation Valve	SGS-PL-V016B	1	PB	1 yr	M *
FT021 Root Isolation Valve	SGS-PL-V017A	1	PB	1 yr	M *
FT023 Root Isolation Valve	SGS-PL-V017B	1	PB	1 yr	M *
FT020 Root Isolation Valve	SGS-PL-V018A	1	PB	1 yr	M *
FT022 Root Isolation Valve	SGS-PL-V018B	1	PB	1 yr	M *
Main Steamline Vent Isolation	SGS-PL-V019A	1	PB	1 yr	M *
Main Steamline Vent Isolation	SGS-PL-V019B	1	PB	1 yr	M *
PT030 Root Isolation Valve	SGS-PL-V022A	~~5~~1	PB	1 yr	M *
PT034 Root Isolation Valve	SGS-PL-V022B	~~5~~1	PB	1 yr	M *
PT031 Root Isolation Valve	SGS-PL-V023A	5	PB	1 yr	M *
PT035 Root Isolation Valve	SGS-PL-V023B	5	PB	1 yr	M *
PT032 Root Isolation Valve	SGS-PL-V024A	~~5~~1	PB	1 yr	M *

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Description	AP1000 Tag No.	Envir. Zone (Note 2)	Function (Note 1)	Operating Time Required (Note 5)	Qualification Program (Note 6)
PT036 Root Isolation Valve	SGS-PL-V024B	~~5~~1	PB	1 yr	M *
PT033 Root Isolation Valve	SGS-PL-V025A	5	PB	1 yr	M *
PT037 Root Isolation Valve	SGS-PL-V025B	5	PB	1 yr	M *
Steamline 1 Nitrogen Supply Isolation	SGS-PL-V038A	5	PB	1 yr	M *
Steamline 2 Nitrogen Supply Isolation	SGS-PL-V038B	5	PB	1 yr	M *
MSIV Bypass Control Isolation	SGS-PL-V042A	5	PB	1 yr	M *
MSIV Bypass Control Isolation	SGS-PL-V042B	5	PB	1 yr	M *
MSIV Bypass Control Isolation	SGS-PL-V043A	5	PB	1 yr	M *
MSIV Bypass Control Isolation	SGS-PL-V043B	5	PB	1 yr	M *
SG1 Condensate Pipe Drain Valve	SGS-PL-V045A	5	PB	1 yr	M *
SG2 Condensate Pipe Drain Valve	SGS-PL-V045B	5	PB	1 yr	M *
LT015 Root Isolation Valve	SGS-PL-V046A	1	PB	1 yr	M *
LT017 Root Isolation Valve	SGS-PL-V046B	1	PB	1 yr	M *
LT015 Root Isolation Valve	SGS-PL-V047A	1	PB	1 yr	M *
LT017 Root Isolation Valve	SGS-PL-V047B	1	PB	1 yr	M *
LT016 Root Isolation Valve	SGS-PL-V048A	1	PB	1 yr	M *
LT018 Root Isolation Valve	SGS-PL-V048B	1	PB	1 yr	M *
LT016 Root Isolation Valve	SGS-PL-V049A	1	PB	1 yr	M *
LT018 Root Isolation Valve	SGS-PL-V049B	1	PB	1 yr	M *
LT044 Root Isolation Valve	SGS-PL-V050A	1	PB	1 yr	M *
LT046 Root Isolation Valve	SGS-PL-V050B	1	PB	1 yr	M *
LT044 Root Isolation Valve	SGS-PL-V051A	1	PB	1 yr	M *
LT046 Root Isolation Valve	SGS-PL-V051B	1	PB	1 yr	M *
LT045 Root Isolation Valve	SGS-PL-V052A	1	PB	1 yr	M *
LT047 Root Isolation Valve	SGS-PL-V052B	1	PB	1 yr	M *
LT045 Root Isolation Valve	SGS-PL-V053A	1	PB	1 yr	M *
LT047 Root Isolation Valve	SGS-PL-V053B	1	PB	1 yr	M *
PT062 Root Isolation Valve	SGS-PL-V056A	5	PB	1 yr	M *
PT063 Root Isolation Valve	SGS-PL-V056B	5	PB	1 yr	M *
Main Feedwater Check	SGS-PL-V058A	5	PB	1 yr	M *
Main Feedwater Check	SGS-PL-V058B	5	PB	1 yr	M *
FT055A Root Isolation Valve	SGS-PL-V062A	5	PB	1 yr	M *
FT056A Root Isolation Valve	SGS-PL-V062B	5	PB	1 yr	M *
FT055A Root Isolation Valve	SGS-PL-V063A	5	PB	1 yr	M *
FT056A Root Isolation Valve	SGS-PL-V063B	5	PB	1 yr	M *
FT055A Root Isolation Valve	SGS-PL-V064A	5	PB	1 yr	M *
FT056A Root Isolation Valve	SGS-PL-V064B	5	PB	1 yr	M *
FT055A Root Isolation Valve	SGS-PL-V065A	5	PB	1 yr	M *
FT056A Root Isolation Valve	SGS-PL-V065B	5	PB	1 yr	M *
SG1 Nitrogen Sparging Isolation	SGS-PL-V084A	1	PB	1 yr	M *
SG2 Nitrogen Sparging Isolation	SGS-PL-V084B	1	PB	1 yr	M *

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ENVIRONMENTALLY QUALIFIED ELECTRICAL AND MECHANICAL EQUIPMENT

Description	AP1000 Tag No.	Envir. Zone (Note 2)	Function (Note 1)	Operating Time Required (Note 5)	Qualification Program (Note 6)
Startup Feedwater Check Valve	SGS-PL-V256A	5	PB	1 yr	M *
Startup Feedwater Check Valve	SGS-PL-V256B	5	PB	1 yr	M *
~~MCR Penetration Test Valve~~	~~VBS-PL-V160~~	~~3~~	~~PB~~	~~1 yr~~	~~M~~
~~MCR Penetration Test Valve~~	~~VBS-PL-V161~~	~~3~~	~~PB~~	~~1 yr~~	~~M~~
~~MCR Penetration Test Valve~~	~~VBS-PL-V162~~	~~3~~	~~PB~~	~~1 yr~~	~~M~~
Test Connection Shutoff for MCR Inlet Isolation Valve V186	VBS-PL-V164	3	PB	1 yr	M
Test Connection Shutoff for MCR Inlet Isolation Valve V187	VBS-PL-V165	3	PB	1 yr	M
Test Connection Shutoff for MCR Outlet Isolation Valve V188	VBS-PL-V166	3	PB	1 yr	M
Test Connection Shutoff for MCR Outlet Isolation Valve V189	VBS-PL-V167	3	PB	1 yr	M
Test Connection Shutoff for MCR Outlet Isolation Valve V190	VBS-PL-V168	3	PB	1 yr	M
Test Connection Shutoff for MCR Outlet Isolation Valve V191	VBS-PL-V169	3	PB	1 yr	M
Air Delivery Line Pressure Instrument Isolation Valve A	VES-PL-V006A	7	PB	1 yr	M
Air Delivery Line Pressure Instrument Isolation Valve B	VES-PL-V006B	7	PB	1 yr	M
Temporary Instrument Isolation Valve A	VES-PL-V016	7	PB	1 yr	M
Temporary Instrument Isolation Valve A	VES-PL-V018	7	PB	1 yr	M
Temporary Instrument Isolation Valve B	VES-PL-V019	7	PB	1 yr	M
Temporary Instrument Isolation Valve B	VES-PL-V020	7	PB	1 yr	M
Air Tank Isolation Valve A	VES-PL-V024A	7	PB	1 yr	M
Air Tank Isolation Valve B	VES-PL-V024B	7	PB	1 yr	M
Air Tank Isolation Valve A	VES-PL-V025A	7	PB	1 yr	M
Air Tank Isolation Valve B	VES-PL-V025B	7	PB	1 yr	M
Refill Line Isolation Valve	VES-PL-V038	7	PB	1 yr	M
DP Instrument Line Isolation Valve A	VES-PL-V043A	3	PB	1 yr	M
DP Instrument Line Isolation Valve B	VES-PL-V043B	3	PB	1 yr	M
Main Air Flowpath Isolation Valve	VES-PL-V044	3	PB	1 yr	M
Containment Isolation Test Connection	VFS-PL-V001	7	PB	1 yr	M
Containment Isolation Test Connection	VFS-PL-V002	1	PB	1 yr	M *
Containment Isolation Test Connection	VFS-PL-V006	1	PB	1 yr	M *
Containment Isolation Test Connection	VFS-PL-V007	6	PB	1 yr	M **
Containment Isolation Test Connection	VFS-PL-V008	6	PB	1 yr	M **
Containment Isolation Test	VFS-PL-V012	1	PB	1 yr	M *

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Connection					
Containment Isolation Test Connection	VFS-PL-V015	1	PB	1 yr	M *
Main Equipment Hatch Test Connection	VUS-PL-V015	7	PB	1 yr	M
Maintenance Equipment Hatch Test Connection	VUS-PL-V016	7	PB	1 yr	M
Personnel Hatch Test Connection	VUS-PL-V017	7	PB	1 yr	M
Personnel Hatch Test Connection	VUS-PL-V018	7	PB	1 yr	M
Personnel Hatch Test Connection	VUS-PL-V019	7	PB	1 yr	M
Personnel Hatch Test Connection	VUS-PL-V020	7	PB	1 yr	M
Personnel Hatch Test Connection	VUS-PL-V021	7	PB	1 yr	M
Personnel Hatch Test Connection	VUS-PL-V022	7	PB	1 yr	M
Fuel Transfer Tube Test Connection	VUS-PL-V023	~~11~~7	PB	1 yr	M *

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ENVIRONMENTALLY QUALIFIED ELECTRICAL AND MECHANICAL EQUIPMENT

Description	AP1000 Tag No.	Envir. Zone (Note 2)	Function (Note 1)	Operating Time Required (Note 5)	Qualification Program (Note 6)
Electrical Penetration Test Isolation Valve	VUS-PL-V101	4	PB	1 yr	M
Electrical Penetration Test Isolation Valve	VUS-PL-V102	4	PB	1 yr	M
Electrical Penetration Test Isolation Valve	VUS-PL-V103	4	PB	1 yr	M
Electrical Penetration Test Isolation Valve	VUS-PL-V104	4	PB	1 yr	M
Electrical Penetration Test Isolation Valve	VUS-PL-V105	4	PB	1 yr	M
Electrical Penetration Test Isolation Valve	VUS-PL-V106	2	PB	1 yr	M
Electrical Penetration Test Isolation Valve	VUS-PL-V107	2	PB	1 yr	M
Electrical Penetration Test Isolation Valve	VUS-PL-V108	2	PB	1 yr	M
Electrical Penetration Test Isolation Valve	VUS-PL-V109	2	PB	1 yr	M
Electrical Penetration Test Isolation Valve	VUS-PL-V110	2	PB	1 yr	M
Electrical Penetration Test Isolation Valve	VUS-PL-V111	2	PB	1 yr	M
Electrical Penetration Test Isolation Valve	VUS-PL-V112	4	PB	1 yr	M
Electrical Penetration Test Isolation Valve	VUS-PL-V113	4	PB	1 yr	M
Electrical Penetration Test Isolation Valve	VUS-PL-V114	4	PB	1 yr	M
Electrical Penetration Test Isolation Valve	VUS-PL-V115	4	PB	1 yr	M
Electrical Penetration Test Isolation Valve	VUS-PL-V116	4	PB	1 yr	M
Electrical Penetration Test Isolation Valve	VUS-PL-V117	4	PB	1 yr	M
Electrical Penetration Test Isolation Valve	VUS-PL-V118	42	PB	1 yr	M
Electrical Penetration Test Isolation Valve	VUS-PL-V119	2	PB	1 yr	M
Electrical Penetration Test Isolation Valve	VUS-PL-V120	2	PB	1 yr	M
Electrical Penetration Test Isolation Valve	VUS-PL-V121	2	PB	1 yr	M
Electrical Penetration Test Isolation Valve	VUS-PL-V122	2	PB	1 yr	M

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ENVIRONMENTALLY QUALIFIED ELECTRICAL AND MECHANICAL EQUIPMENT

Description	AP1000 Tag No.	Envir. Zone (Note 2)	Function (Note 1)	Operating Time Required (Note 5)	Qualification Program (Note 6)
Electrical Penetration Test Isolation Valve	VUS-PL-V123	2	PB	1 yr	M
Electrical Penetration Test Isolation Valve	VUS-PL-V124	~~2~~4	PB	1 yr	M
Spare Penetration Test Connection	VUS-PL-V140	~~7~~6	PB	1 yr	M**
Spare Penetration Test Connection	VUS-PL-V141	~~7~~6	PB	1 yr	M**
Spare Penetration Test Connection	VUS-PL-V142	~~7~~6	PB	1 yr	M**
VWS Supply Containment Penetration IRC Test Connection/Vent	VWS-PL-V424	1	PB	1 yr	M *
VWS Return Containment Penetration ORC Test Connection/Vent	VWS-PL-V425	2	PB	1 yr	M
Heat Exchangers					
Normal Residual Heat Removal Heat Exchanger A	RNS-ME-01A	6	PB	1 yr	M**
Normal Residual Heat Removal Heat Exchanger B	RNS-ME-01B	6	PB	1 yr	M**
Tanks					
Spent Fuel Pool	FHS-MT-01	11	ESF	1 yr	M **
Fuel Transfer Canal	FHS-MT-02	11	ESF	1 yr	M **
Spent Fuel Cask Loading Pit	FHS-MT-05	6	ESF	1 yr	M**
Passive Containment Cooling Water Storage Tank	PCS-MT-01	9	ESF	1 yr	M
Water Distribution Bucket	PCS-MT-03	9	ESF	1 yr	M
Water Collection Troughs	PCS-MT-04	9	ESF	1 yr	M
Passive RHR Heat Exchanger	PXS-ME-01	1	ESF	1 yr	M *
Accumulator Tank A	PXS-MT-01A	1	ESF	1 yr	M *
Accumulator Tank B	PXS-MT-01B	1	ESF	1 yr	M *
Core Makeup Tank A	PXS-MT-02A	1	ESF	1 yr	M *
Core Makeup Tank B	PXS-MT-02B	1	ESF	1 yr	M *
In-Containment Refueling Water Storage Tank	PXS-MT-03	1	ESF	1 yr	M *
Emergency Air Storage Tank 01	VES-MT-01	7	ESF	1 yr	M
Emergency Air Storage Tank 02	VES-MT-02	7	ESF	1 yr	M
Emergency Air Storage Tank 03	VES-MT-03	7	ESF	1 yr	M
Emergency Air Storage Tank 04	VES-MT-04	7	ESF	1 yr	M
Emergency Air Storage Tank 05	VES-MT-05	7	ESF	1 yr	M
Emergency Air Storage Tank 06	VES-MT-06	7	ESF	1 yr	M
Emergency Air Storage Tank 07	VES-MT-07	7	ESF	1 yr	M
Emergency Air Storage Tank 08	VES-MT-08	7	ESF	1 yr	M
Emergency Air Storage Tank 09	VES-MT-09	7	ESF	1 yr	M

Table 3.11-1 (Sheet 45 of 45)

ENVIRONMENTALLY QUALIFIED ELECTRICAL AND MECHANICAL EQUIPMENT

Description	AP1000 Tag No.	Envir. Zone (Note 2)	Function (Note 1)	Operating Time Required (Note 5)	Qualification Program (Note 6)
Emergency Air Storage Tank 10	VES-MT-10	7	ESF	1 yr	M
Emergency Air Storage Tank 11	VES-MT-11	7	ESF	1 yr	M
Emergency Air Storage Tank 12	VES-MT-12	7	ESF	1 yr	M
Emergency Air Storage Tank 13	VES-MT-13	7	ESF	1 yr	M
Emergency Air Storage Tank 14	VES-MT-14	7	ESF	1 yr	M
Emergency Air Storage Tank 15	VES-MT-15	7	ESF	1 yr	M
Emergency Air Storage Tank 16	VES-MT-16	7	ESF	1 yr	M
Emergency Air Storage Tank 17	VES-MT-17	7	ESF	1 yr	M
Emergency Air Storage Tank 18	VES-MT-18	7	ESF	1 yr	M
Emergency Air Storage Tank 19	VES-MT-19	7	ESF	1 yr	M
Emergency Air Storage Tank 20	VES-MT-20	7	ESF	1 yr	M
Emergency Air Storage Tank 21	VES-MT-21	7	ESF	1 yr	M
Emergency Air Storage Tank 22	VES-MT-22	7	ESF	1 yr	M
Emergency Air Storage Tank 23	VES-MT-23	7	ESF	1 yr	M
Emergency Air Storage Tank 24	VES-MT-24	7	ESF	1 yr	M
Emergency Air Storage Tank 25	VES-MT-25	7	ESF	1 yr	M
Emergency Air Storage Tank 26	VES-MT-26	7	ESF	1 yr	M
Emergency Air Storage Tank 27	VES-MT-27	7	ESF	1 yr	M
Emergency Air Storage Tank 28	VES-MT-28	7	ESF	1 yr	M
Emergency Air Storage Tank 29	VES-MT-29	7	ESF	1 yr	M
Emergency Air Storage Tank 30	VES-MT-30	7	ESF	1 yr	M
Emergency Air Storage Tank 31	VES-MT-31	7	ESF	1 yr	M
Emergency Air Storage Tank 32	VES-MT-32	7	ESF	1 yr	M
Main Feed Pump A Status	ECS ES 3 XXX	8	PAMS	2 wks	E +
Main Feed Pump B Status	ECS ES 4 XXX	8	PAMS	2 wks	E +
Main Feed Pump C Status	ECS ES 5 XXX	8	PAMS	2 wks	E+

Notes:

1. RT (Reactor Trip), ESF (Engineered Safeguards Feature), PAMS (Post-Accident Monitoring), ISOL (Isolation), PB (Pressure Boundary), All Active Valves in this Table have "PB – 1 yr" in addition to any other requirements)
2. Zones identified in Table 3D.5-1
3. Not required post-accident
4. Note deleted
5. Reference Table 3D.4-2
6. E = Electrical Equipment Program
   M = Mechanical Equipment Program
   * = Harsh Environment
   ** = Radiation-Harsh Environment (See Appendix 3D Section 3D.4.3)
   + = Seismic Qualification not required
   S = Qualified for operation with spray from a moderate-energy pipe crack or spray from a cold high energy pipe crack.
7. The Protection and Safety Monitoring Cabinets will be qualified to meet the function operating times identified in this table.

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DCD Chapter 3 Appendix 3D Changes:

Change 3D-1 Page 3D-2, Paragraph 1:

APPENDIX 3D

METHODOLOGY FOR QUALIFYING AP1000 SAFETY-RELATED ELECTRICAL AND MECHANICAL EQUIPMENT

Safety-related electrical equipment is tested under the environmental conditions expected to occur in the event of a design basis event. This testing provides a high degree of confidence in the safety-related system performance under the limiting environmental conditions. Qualification criteria were revised by IEEE 323-1974 (Reference 1) and by Regulatory Guide 1.89, which endorses this IEEE standard. The concept of aging was highlighted in IEEE 323-1974, and interpretation of the scope of aging and implementation methods were subsequently developed. 10 CFR 50.49 provides the NRC requirements for qualification of equipment located in potentially harsh environments. Therefore, the guidance provided by IEEE 323-1974 is the evolutionary root of requirements, recommended methods, and qualification procedures described in this appendix.

Specific treatment of seismic qualification, part of the qualification test sequence recommended in IEEE 323-1974, is addressed in IEEE 344-1987 (Reference 2). This appendix bases technical guidance, recommendations, and requirements for seismic qualification on IEEE 344-1987.

The AP1000 Equipment Qualification methodology addresses the expanded scope of IEEE 627-1980 (Reference 3), which encompasses the qualification of Class 1E electrical and safety-related mechanical equipment. IEEE 627 generalizes the principles and technical guidance of IEEE 323 and 344. Compliance with the IEEE 323-1974 and 344-1987 is the specific means of compliance with the intent of IEEE 627-1980 for safety-related electrical and mechanical equipment.

Safety-related electrical and mechanical equipment is typically qualified using analysis, testing, or a combination of these methods. The specific method or methods used depend on the safety-related function of the equipment type to be qualified. Safety-related mechanical equipment, such as tanks and valves, is typically qualified by analysis, with supplementary functional testing when functional operability is demonstrated only through testing, as is the case for active valves. Either testing or testing combined with analysis is the method used for environmental and seismic qualification of safety-related (Class 1E) electrical equipment.

The technical discussions of this appendix follow the format headings of the equipment qualification data packages (EQDPs) to be issued as specific qualification program documentation. This formatting (see Section 3D.7) permits easy cross-reference between the methodology defined in this report and the detailed plans contained in the equipment qualification data packages. Attachment A of this appendix is the format used for the equipment qualification data package.

Attachment B of this appendix, "Aging Evaluation Program," describes methods for addressing

potential age-related, common-mode failure mechanisms used in AP1000 equipment qualification programs. The approach conforms with current industry positions and makes maximum use of available data and experience in the evaluation, test, and analysis of aging mechanisms.

Attachment C, "Effects of Gamma Radiation Doses Below 10^4 rads on the Mechanical Properties of Materials," provides the basis that radiation aging below 10^4 rads is not a significant factor in the ability of the equipment to perform properly during a seismic event. For some devices, electrical properties are degraded below 10^3 rads. Radiation aging for equipment not required to perform a safety-related function in a high-energy line break environment ~~and~~ or subject to lifetime doses of less than 10^4 rads is not addressed in AP1000 test programs.

Attachment D, "Accelerated Thermal Aging Parameters," describes the methodology employed in calculating the accelerated thermal aging parameters used in this program.

Attachment E, "Seismic Qualification Techniques," discusses available methods for establishing a seismic qualification basis, by either test or analysis, and its application to the qualification of safety-related equipment for the AP1000.

Change 3D-1:

3D.1 Purpose

The basic objectives of qualification of safety-related electrical and mechanical equipment follow:

- To reduce the potential for common cause failures due to specified environmental and seismic events
- To demonstrate that safety-related electrical and mechanical equipment is capable of performing its designated safety-related functions.

This appendix describes the methodology that has been adopted to qualify equipment according to IEEE 627-1980, "IEEE Standard for Design Qualification of Safety System Equipment Used in Nuclear Power Generating Stations." The two standards primarily used to demonstrate compliance with this standard are IEEE 323-1974, "IEEE Standard for Qualifying Class 1E Equipment for Nuclear Power Generating Stations," and IEEE 344-1987, "IEEE Recommended Practices for Seismic Qualification of Class 1E Equipment for Nuclear Power Generating Stations."

Change 3D-2:

3D.4.1.2 NRC Regulatory Guides

In the area of seismic and environmental qualification of safety-related electrical and mechanical equipment, the NRC has issued the following Regulatory Guides:

Regulatory Guide 1.33, "Quality Assurance Program Requirements (Operation)" – The guide endorses ANS and ANSI standards for quality assurance programs, but is considered here specifically for guidance in determining documentation adequacy. Appendix A of the guide, Item 9, "Procedures for Performing Maintenance," addresses procedural and documentation requirements for maintenance of safety-related equipment, preventive maintenance, repair, and replacement. This guide is a source in the development of qualification efforts ~~that rely on operating experience, as described in subsection 3D.6.3, or~~ in the on-going qualification programs discussed in subsection 3D.6.4.

Regulatory Guide 1.61, "Damping Values for Seismic Design of Nuclear Plants" – The guide prescribes acceptable values of damping used in elastic modal dynamic seismic analysis of seismic Category I structures, systems, and components. The AP1000 equipment qualification program is based on Regulatory Guide 1.61 and on values considered to be acceptable based on past NRC acceptances. The safe shutdown earthquake (SSE) damping values used for the qualification of mechanical and electrical equipment are listed in Table 3.7.1-1 of Chapter 3.

Regulatory Guide 1.63, "Electric Penetration Assemblies in Containment Structures for Nuclear Power Plants" – The guide endorses, with certain qualifications, IEEE 317-1983. External circuit protection of electric penetration assemblies should meet the provisions of Section 5.4 of IEEE 741-1986, "Criteria for Protection of Class 1E Power Systems and Equipment in Nuclear Generating Stations, as these are beyond the of scope IEEE 317. The AP1000 design complies with IEEE 741-1997. The AP1000 equipment qualification program employs the recommendations of Regulatory Guide 1.63, Revision 3, in specifying qualification plans as a means of supplementing the guidance of IEEE 317 and 323.

Regulatory Guide 1.73, "Qualification Tests of Electric Valve Operators Installed Inside the Containment of Nuclear Power Plants" – The guide endorses, with certain qualifications, IEEE 382-1972. The AP1000 equipment qualification program employs recommendations of Regulatory Guide 1.73, but gives preference to the guidance of IEEE 382-1985, where it is necessary to supplement the guidance of IEEE 323 or 344 in specifying qualification plans for electric valve operators.

Regulatory Guide 1.89, "Qualification of Class 1E Equipment for Nuclear Power Plants" – The guide provides guidance for conformance with 10 CFR 50.49, and endorses the procedures of IEEE 323-1974 as an acceptable means for qualifying Class 1E equipment. Implicit in the endorsement of IEEE 323 is the reference to seismic qualification methods of IEEE 344 as a part of the qualification test sequence. (See Regulatory Guide 1.100 later in this discussion.) The AP1000 equipment qualification methodology addresses the recommendations of Regulatory Guide 1.89 by the following:

- The recommendations of IEEE 323-1974 are met by the methods discussed in this appendix

- The radiation source terms used in qualification differ from those of Regulatory Guide 1.89, and are described in Section 3D.5 of this appendix

- The seismic qualification requirements employ the recommendations of IEEE 344-1987 as described in Attachment E of this appendix.

Regulatory Guide 1.92, "Combining Modal Responses and Spatial Components in Seismic Response Analysis" – The guide describes methods and procedures for the following:

- Combining the values of the response of individual modes in a response spectrum modal dynamic analysis to find the representative maximum value of a particular response of interest for each of the three orthogonal seismic spatial components

- Combining the maximum values (or representative maximum values) of the responses for a given element of a system or item of equipment, determined for each of the three orthogonal spatial components.

Regulatory Guide 1.97 Revision 3, "Instrumentation for Light-Water-Cooled Nuclear Power Plants to Assess Plant and Environs Conditions During and Following and An Accident." The guide describes a method acceptable to provide instrumentation to monitor plant variables and systems during and following an accident in light-water-cooled nuclear power plant. The AP1000 program identified as the post accident monitoring instrumentation system (PAMS), provides the capability to monitor plant variables and systems operating status during and following an accident. PAMS includes those instruments provided to indicate system operating status and furnish information regarding the release of radioactive materials.

The AP1000 equipment qualification program employs methods consistent with the recommendations of Regulatory Guide 1.92 when combining individual modal response values or the response of three independent spatial components in seismic analyses.

Regulatory Guide 1.100, "Seismic Qualification of Electrical Equipment for Nuclear Power Plants" – The guide endorses IEEE 344-1987. Regulatory Guide 1.100 particularly notes that IEEE 344-1987 is applied in the qualification of safety-related mechanical equipment, as well as Class 1E electrical equipment. The AP1000 equipment qualification methodology employs the recommendations of Regulatory Guide 1.100, as described in Attachment E of this appendix.

Regulatory Guide 1.122, "Development of Floor Design Response Spectra for Seismic Design of Floor-Supported Equipment or Components" – The guide describes specific methods for developing floor (and other equipment mounting locations) response spectra. Included are specific criteria for the broadening frequency amplitude peaks and smoothing of the frequency amplitude spectrum to incorporate conservatism in the seismic requirements. This is to compensate for other uncertainties of analysis. The AP1000 equipment qualification program employs methods consistent with the recommendations of Regulatory Guide 1.122.

Regulatory Guide 1.131, "Qualification Tests of Electrical Cables, Field Splices, and Connections for Light-Water Cooled Nuclear Power Plants" – The guide endorses IEEE 383-1974. The AP1000 equipment qualification program employs the recommendations of Regulatory Guide 1.131 in specifying the qualification program plans where this guide supplements the guidance of IEEE 383 and to further demonstrate conformance with the guidance of IEEE 323. As neither IEEE 383 nor Regulatory Guide 1.131 specifically addresses considerations for cable field splices and connections, guidance for their qualification is taken from IEEE 572 and Regulatory Guide 1.156.

Regulatory Guide 1.156, "Environmental Qualification of Connection Assemblies for Nuclear Power Plants" – The guide endorses IEEE 572-1985. The AP1000 equipment qualification program employs the recommendations of Regulatory Guide 1.156 in specifying the qualification program plans where this guide supplements the guidance of IEEE 572 to demonstrate conformance with the guidance of IEEE 323.

Regulatory Guide 1.158, "Qualification of Safety-Related Lead Storage Batteries for Nuclear Power Plants" – The guide endorses IEEE 535-1986. The AP1000 equipment qualification program employs the recommendations of Regulatory Guide 1.158 in specifying the qualification program plans where this guide supplements the guidance of IEEE 535 to demonstrate conformance with the guidance of IEEE 323.

Change 3D-1:

3D.4.2 Definitions

Definitions of terms used in this appendix are contained in the referenced standards and IEEE 100, "The Authoritative Dictionary of IEEE Standards Terms, Seventh Edition.~~IEEE Dictionary of Electrical and Electronic Terms~~." Subsection 3D.4.5 clarifies the definitions of "life" (that is, design, shelf, and qualified life) as used in this methodology. The terms "design life" and "qualified life" have the meanings set forth in IEEE 323 and are used in the context of that standard.

Change 3D-1:

3D.4.4 Test Sequence

Where the test sequence deviates from that recommended by IEEE 323-1974, the deviation is justified. The test sequence employed for a given hardware item is specified in the equipment qualification data package Sections 2.1 and 3.6 (see Attachment A for example). Note that for this reference and ~~subsequence~~ subsequent references to Attachment A the information in Attachment A will be completed by the Combined License applicant. Clarifications to the IEEE 323-1974 recommended test sequence are discussed in the following:

1. Burn-In Test

For electronic equipment, a burn-in test is completed, before operational testing of the

equipment, to eliminate infant failures. The test consists of energizing the equipment for a minimum of 50 hours at nominal voltage and frequency under ambient temperature conditions. Any malfunction observed during these tests are repaired, and the 50-hour burn-in test is repeated for the repaired portion of the equipment.

2. Performance Extremes Test

For equipment where seismic testing has previously been completed employing the recommended methods of IEEE 344-1987, seismic testing is not repeated. Testing of the equipment to demonstrate qualification at performance extremes is separately performed as permitted by IEEE 323-1974, subsection 6.3.2(3). Additional discussion is provided in subsection 3D.6.5.1.

3. Aging Simulation and Testing

For equipment located in a mild environment, aging is addressed as described in subsections 3D.6.3, 3D.6.4, and Attachment B. If there are no known aging mechanisms that significantly degrades the equipment during its service life, it is acceptable to perform seismic testing of unaged equipment. Separate testing or analysis (or both) is provided to demonstrate that the aging of components is not significant during the projected service or qualified life of the equipment.

4. Synergistic Effects

An important consideration in the aging of equipment for harsh environment service is the possible existence of synergistic effects when multiple stress environments are applied simultaneously. This potential is addressed by conservatism inherent in the determination and use of the worst-case aging sequence and conservative accelerated aging parameters.

The combination of effects from pressure, temperatures, humidity, and chemistry are addressed by the high-energy line break (HELB) tests. Since the test item is not exposed to radiation during this test, the effects of this parameter are conservatively addressed by subjecting the test items to the required total integrated dose before the high-energy line break. Specifically for instruments, the summing of errors for the irradiation and high-energy line break portions of the test sequence is a means of achieving conservatism.

5. Visual Inspections/Disassembly

The results of post-test visual inspections are not necessarily documented unless problems are discovered. Disassembly is performed only when test results or visual inspections require further investigation.

Change 3D-1:

3D.5.2.1 Abnormal Environments Inside Containment

In the AP1000 equipment qualification program there are multiple events postulated at least once over the 60 year design expectation which cause abnormal environmental conditions in the containment. These are divided into two groups of events, based on peak containment temperatures expected.

Group 1: 150°F Events

- Loss of a fan cooler
- Loss of all ac for up to 2 hours
- Pressurizer safety valve open/close during reactor coolant system transient

Group 2: ~~240~~250°F Events

- Spurious automatic depressurization system (ADS) actuation
- Passive residual heat removal (PRHR) system use (long-term)
- Reactor coolant system depressurization via pressurizer safety valve
- Small loss of coolant accident

Table 3D.5-3 presents the conditions associated with each of these abnormal environment events. Plant recovery occurs after each event with varying degrees of time and maintenance efforts. Thus, the conditions resulting from these events are considered in the development of aging test parameters. Event frequency, conditions, and duration are accounted for within the context of the qualified life objective of each equipment type test program.

Submergence of some equipment during certain spurious automatic depressurization system actuation scenarios is addressed by testing. Submergence testing associated with high-energy line break conditions, (subsection 3D.5.5.1.7) envelops the submergence conditions associated with abnormal environments.

Margin in low pH value is not included, but is addressed by the continued injection through the first 24 hours. Margin in alkaline pH, where adjustment is necessary, is incorporated by a 10 percent increase in alkalinity.

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Change 3D-4:

3D.5.5.1.1 Radiation Environment – Loss of Coolant Accident

The radiation dose rates and integrated doses following a design basis loss-of-coolant accident (LOCA) are determined based on the criteria and guidance provided in NUREG 1465, "Accident Source Terms for Light-Water Nuclear Power Plants – Final Report" (Reference 8), and Regulatory Guide 1.183, "Alternative Radiological Source Terms for Evaluating Design Basis Accidents at Nuclear Power Reactors" (Reference 9).

The radiation exposure inside the containment is conservatively estimated by considering the dose in the middle of the AP1000 containment. Radioactive sources are assumed to be uniformly distributed throughout the containment atmosphere and plate out of non-gaseous activity on containment surfaces is considered.~~with~~ ~~n~~No credit is taken for the shielding provided by internal structures and equipment.

Sources are based on the emergency safeguards system core thermal power rating and the following analytical assumptions:

- Power Level (including 2-percent power uncertainty) ..... 3,468 MWt

- Fraction of total core inventory released to the containment atmosphere:

Noble Gases (Xe, Kr)	1.0
Halogens (I, Br)	0.40
Alkali Metals (Cs, Rb)	0.30
Tellurium Group (Te, Sb, Se)	0.05
Barium, Strontium (Ba, Sr)	0.02
Noble Metals (Ru, Rh, Pd, Mo, Tc, Co)	0.0025
Lanthanides (La, Zr, Nd, Eu, Nb, Pm, Pr, Sm, Y, Cm, Am)	0.0002
Cerium Group (Ce, Pu, Np)	0.0005

The radionuclide groups and elemental release fractions listed above are consistent with the accident source term information presented in NUREG-1465 ~~(Reference 8), "Accident Source Terms for Light-Water Nuclear Power Plants – Final Report."~~ and Regulatory Guide 1.183.

The timing of the releases are based on NUREG-1465 assumptions. The release scenario assumed in the calculations is described below.

An initial release of activity from the gaps of a number of failed fuel rods at 10 minutes into the accident is considered. The release of ~~5~~3 percent of the core inventory of the volatile species (defined as noble gases, halogens, and alkali metals) is assumed. ~~The~~ An additional release period occurs over the next 30 minutes, that is, from 10 to 40 minutes into the accident. At this point, 5 percent of the total core inventory of volatile species has been considered to be released.

Over the next 1.3 hours, releases associated with an early in-vessel release period are assumed to

occur, that is, from 40 minutes to 1.97 hours into the accident. This source term is a time-varying release in which the release rate is assumed to be constant during the duration time. Additional releases during the early in-vessel release period include 95 percent of the noble gases, 35 percent of the halogens, and 25 percent of the alkali metals, as well as the fractions of the tellurium group, barium and strontium, noble metals, lanthanides, and cerium group as listed above.

There is no additional release of activity to the containment atmosphere after the in-vessel release phase. Activity removal by natural mechanisms as described in Section 15.6.5.3.2 and Chapter 15, Appendix B are considered only during the first 24 hours following the accident.

The above source terms are consistent with the guidance provided by the NRC in Regulatory Guide 1.183 for design basis accident (DBA) loss-of-coolant accident (LOCA) evaluations.

Based on these assumptions the instantaneous and integrated gamma and beta doses for the containment atmosphere following a loss of coolant accident are shown in Figures 3D.5-2 and 3D.5-3, respectively.

The total integrated dose of radiation employed for testing is a combination of normal and design basis event dose, as applicable. It is defined to equal or exceed the maximum radiation dose contained in the specification (Attachment A, Section 1.8.4.). A margin of 10 percent is included in defining the total integrated dose for testing. Normal operating and design basis event gamma doses are simulated using a cobalt-60 source. The test dose is applied at a rate approximate to the initial phase of the design basis event dose rate shown in Figure 3D.5-2 as modified by shielding effects (typically 0.2 to 0.25 Mr/hr).

Where exposed organic material is evaluated by test for the effect of (accident) beta radiation, a beta source is employed. Or a cobalt-60 or spent fuel source is used to impart the same dose using gamma radiation. When doing beta equivalent testing, the total integrated dose using gamma is conservatively equal to the beta total integrated dose, or the resulting bremsstrahlung is calculated and the test item is exposed to an equivalent gamma dose.

Radiation conditions for loss of coolant accident envelop other scenarios, such as rod ejection.

Change 3D-4:

3D.5.5.1.2 Radiation Environment – Steam Line Break Accident

Sources associated with a steam line break accident are based on the release of reactor coolant system activity, assuming operation with the design basis fuel defect level of 0.25 percent. It is further assumed that an "event-initiated" iodine activity spike ~~increase~~ occurs, which increases the reactor coolant activity during the accident, based on a rate of increase that is 500 times the normal activity appearance rate in the reactor coolant. ~~by the maximum of:~~

~~•60 times the maximum allowed by technical specifications, or~~
~~1.At a rate 500 times the normal rate.~~

The activity inventory is instantaneously released into the containment atmosphere. The dose is conservatively estimated by considering the dose rate in the middle of the containment, with no credit for the shielding provided by the internal structures, components, and equipment. The instantaneous and integrated gamma and beta doses for the containment atmosphere following a steam line break are shown in Figures 3D.5-4 and 3D.5-5, respectively.

Change 3D-4:

3D.5.5.1.4 Total Integrated Dose Specification

The applicable accident doses specified in equipment qualification data package subsection 1.7.4 of Attachment A, have been derived based upon the time required to perform the specified safety function in the accident environment (Attachment A, subsection 1.6.1) and the dose calculations described previously, subject to the following modifications:

- ~~In the general area between the loop compartment wall and containment vessel the gamma dose levels are calculated to be a factor of 2.7 less to allow for the effects of shielding in this area.~~

- For equipment only required to provide trip or activation functions after accidents involving no release of radioactive material for at least one hour, the radiation dose is based on the normal dose rates (Table 3D.5-2).

Change 3D-3:

3D.5.5.1.5 Temperature/Pressure Environments

The design basis events addressed are the loss of coolant accident, steam line break and feedwater line break. The WGOTHIC code is utilized to calculate the temperature and pressure conditions resulting from these breaks. To retain the option of qualifying equipment for each of these high-energy line break conditions, as applicable, separate environmental containment envelopes are specified for the higher irradiation/lower saturated temperature conditions of the loss of coolant accident (Figures 6.2.1.1-7 and 6.2.1.1-10) as against the lower irradiation/short-term superheated temperature conditions associated with the steam line break (Figures 6.2.1.1-1 and 6.2.1.1-2). To limit the number of basic envelopes, this latter envelope is conservatively employed to define the containment environmental envelope following a feedline break.

Additionally, to facilitate AP1000 generic qualification and testing, the environmental envelopes specified in Figures 6.2.1.1-1, 6.2.1.1-2, 6.2.1.1-7 and 6.2.1.1-10 have been combined to a single high-energy line break profile depicted in Figure 3D.5-8. This combined profile encompasses all locations inside containment on the basis of the containment analyses for the AP1000 design. The profile is used to qualify equipment for any application or location for the AP1000 consistent with the NRC requirements in 10 CFR 50.49 and IEEE 308, 323, 603, and 627 when margin is added and~~,~~ via conformance with IEEE 323 guidelines.

Qualification tests to high-energy line break conditions are designed to address the applicable specified environment(s) with a margin of 15°F and 10 psi. Separate envelopes (Figures 6.2.1.1-1, 6.2.1.1-2, 6.2.1.1-7 and 6.2.1.1-10) with margin are employed, or a combined loss of coolant accident/steam line break/feedwater line break envelope (Figure 3D.5-8 and Figure 3D.5-9) may be employed for in-containment equipment qualification tests. Figures 3D.5-8 and 3D.5-9 do not include margin from IEEE 323-1974 which will be incorporated in the environmental qualification programs. The simulated post-design basis event aging time-temperature profile (Figures 3D.5-8 and 3D.5-9 from 24 hours to test conclusion) is defined consistent with the smallest value of activation energy applicable to the thermal aging sensitive components composing the test equipment or by a demonstrably conservative activation energy, as described in Attachment D.

Change 3D-3:

3D.5.5.2 High-Energy Line Break Accidents Outside Containment

For the majority of equipment located outside containment, the normal operating environment remains unchanged by a high-energy line break accident. As a consequence, qualification for such events is covered by qualification for normal conditions.

A limited amount of equipment located outside containment, near high-energy lines, could be subject to local hostile environmental conditions because of a high-energy line break outside containment. In this case, the equipment is qualified for the conditions resulting from events affecting its location and for which it is required to operate. ~~These conditions are shown in~~ Figure 3D.5-9~~.~~ ~~Sheet 1~~ shows the ~~combined~~ design ~~and test~~ conditions for equipment that is required to perform throughout ~~all~~ postulated events ~~where superheat is delayed past five minutes. Sheet 2 shows the combined design and test conditions for equipment that is only required to perform for the first five minutes into the event.~~ Figure 3D.5-9 does not include margin from IEEE 323-1974 which will be incorporated in the environmental qualification program. The maximum pressure for any event outside containment is ~~less than~~ 6 psig.

Change 3D-1:

3D.6 Qualification Methods

The recognized methods available for qualifying safety-related electrical equipment are established in IEEE 323. These are type testing, operating experience, analysis, on-going qualification, or a combination of these methods. The choice of qualification method for a particular item of equipment is based upon many factors. These factors include practicability, size and complexity of equipment, economics, and availability of previous qualification to earlier standards.

The qualification method employed for each equipment type included under the AP1000 equipment qualification program is identified in the individual equipment qualification data packages whether by test (Attachment A, Section 3.0), analysis (Attachment A, Section 4.0), experience (Attachment A, Section ~~3~~5.0), ~~analysis (Attachment A, Section 5.0),~~ or by a

combination of these methods. The AP1000 equipment qualification program may employ on-going qualification through the use of maintenance and surveillance. Guidance for such an approach is not included in this appendix.

Change 3D-4:

3D.8 References

1. IEEE 323-1974, "IEEE Standard for Qualifying Class 1E Equipment for Nuclear Power Generating Stations."

2. IEEE 344-1987, "IEEE Recommended Practice for Seismic Qualification of Class 1E Equipment for Nuclear Power Generating Stations."

3. IEEE 627-1980, "IEEE Standard for Design Qualification of Safety System Equipment Used in Nuclear Power Generating Stations."

4. NUREG/CR-3156, "A Survey of the State-of-the-Art in Aging of Electronics with Application to Nuclear Plant Instrumentation."

5. EPRI NP-1558, Project 890-1, "A Review of Equipment Aging Theory and Technology."

6. NUREG/CR 2156, "Radiation Thermal Degradation of PE and PVC: Mechanism of Synergism and Dose Rate Effects," Clough and Gillen, June 1981.

7. NUREG/CR 2157, "Occurrence and Implication of Radiation Dose Rate Effects for Material Aging Studies," Clough and Gillen, June 1981.

8. NUREG-1465, "Accident Source Terms for Light-Water Nuclear Power Plants – Final Report," L. Soffer, et al., February 1995.

9. Regulatory Guide 1.183, "Alternative Radiological Source Terms for Evaluating Design Basis Accidents at Nuclear Power Reactors," July 2000.

Note: See subsection 3D.4.1.1 for other IEEE references.

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Change 3D-1:

Table 3D.4-2

EQUIPMENT POST-ACCIDENT OPERABILITY TIMES

Equipment	Required Post-Accident Operability	
Equipment necessary to perform trip functions	5 minutes	(~~Envelopes~~ Envelops trip time requirements)
Equipment located outside containment, is accessible, and can be repaired, replaced, or recalibrated	2 weeks	
Equipment located inside containment that is inaccessible and is required for post-accident monitoring	4 months	(This number is based on an acceptable amount of time to be repaired, replaced, or recalibrated, or for an equivalent indication to be obtained.)
Equipment located inside containment, is inaccessible, or cannot be repaired, replaced, recalibrated or equivalent indication cannot be obtained	1 year	
Equipment located in a mild environment following an accident	Various	(Specific as to function, maximum of 1 year)

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Change 3D-5:

Table 3D.5-1 (Sheet 1 of 3)

NORMAL OPERATING ENVIRONMENTS

(Notes 1 and 2)

Location/Parameter	Normal Range	Notes
Zone 1 – Containment (Room numbers: 11000 through 11999)		
Temperature	50° - 120°F	
Pressure	-0.2 - +1.0 psig	
Humidity	0 - 100%	
Radiation	see Table 3D.5-2	
Chemistry	None	
Zone 2 - Auxiliary Building - Non-Radiological - I&C, DC Equipment, RCP Switchgear & Battery rooms, etc. (Room numbers: 12101, 12102, 12103, 12104, 12105, 12111, 12112, 12113, 12201, 12202, 12203, 12204, 12205, 12207, 12211, 12212, 12213, 12301, 12302, 12303, 12304, 12305, 12311, 12312, 12313, 12405, 12411, 12412, 12501, and 12505)		
Temperature	67 - 73°F	
Pressure	Slightly positive to slightly negative	
Humidity	10 - 60%	
Radiation	$<10^3$ rads gamma	
Chemistry	None	
Zone 3 - Auxiliary Building - Non-Radiological - Main Control Room (Room number: 12400, 12401)		
Temperature	67 - 78°F	
Pressure	Slightly positive	
Humidity	25 - 60%	
Radiation	$<10^3$ rads gamma	
Chemistry	None	
Zone 4 - Auxiliary Building - Non-Radiological - Accessible (Room numbers: 12321, 12421, 12422, 12423)		
Temperature	50 - 105°F	
Pressure	Slightly positive	
Humidity	10 - 60%	
Radiation	$<10^3$ rads gamma	
Chemistry	None	

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Table 3D.5-1 (Sheet 2 of 3)

NORMAL OPERATING ENVIRONMENTS

(Notes 1 and 2)

Location/Parameter	Normal Range	Notes
Zone 5 - Auxiliary Building - Non-Radiological - MSIV Compartments (Room numbers: 12404, 12406, 12504, 12506~~, 12701~~)		
Temperature	50 - 130°F	
Pressure	Atmospheric	
Humidity	10 - 100%	
Radiation	<10$\underline{3}$ rads gamma	
Chemistry	None	
Zone 6 - Auxiliary Building - Radiological - Inaccessible (Room numbers: 12154, 12158, 12162, 12163, 12166, 12167, 12171, 12172, 12254, 12255, 12256, 12258, 12262, 12264, 12265, 12354, 12362, 12363, 12365, 12371, 12372, 12373, 12374, 12454, 12462, 12463)		
Temperature	50 - 130°F	
Pressure	Slightly negative to atmospheric	
Humidity	10 - 100%	
Radiation	See Table 3D.5-2	
Chemistry	None	
Zone 7 - Auxiliary Building - Radiological - Accessible (Room numbers: 12151, 12152, 12155, 12156, 12161, ~~12165~~, 12169, 12241, 12242, 12244, 12251, 12252, 12261, 12268, 12271, 12272, 12273, 12274, 12275, 12341, 12351, 12352, 12361, 12451, 12452, 12461, 12551, 12552, 12553, 12554, 12555, 12561)		
Temperature	50 - 104°F	
Pressure	Atmospheric	
Humidity	10 - 100%	
Radiation	See Table 3D.5-2	
Chemistry	None	
Zone 8 - Turbine Building (Room numbers: 20300 through 20799)		
Temperature	50 - 104°F	
Pressure	Atmospheric	
Humidity	10 - 100%	
Radiation	<103 rads gamma	
Chemistry	None	

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Table 3D.5-1 (Sheet 3 of 3)

NORMAL OPERATING ENVIRONMENTS

(Notes 1 and 2)

Location/Parameter	Normal Range	Notes
Zone 9 - Auxiliary Building - PCS Valve Room (Room number: 12541,12701)		
Temperature	50 - 120°F	
Pressure	Atmospheric	
Humidity	10 - 100%	
Radiation	See Table 3D.5-2	
Chemistry	None	
Zone 10 - Auxiliary Building - Non-Radiological - Valve/Piping Penetration Room with SG Blowdown (Room number: 12306)		
Temperature	50 - 105°F	
Pressure	Slightly positive	
Humidity	10 - 60%	
Radiation	<103 rads gamma	
Chemistry	None	
Zone 11 - Auxiliary Building - Radiological - Fuel Handling Area (Room numbers: 12562, 12563, 12564)		
Temperature	50 - 105°F	
Pressure	Slightly negative	
Humidity	10 - 100%	
Radiation	See Table 3D.5-2	
Chemistry	None	

Notes:
1. Room numbers - see Section 1.2, General Arrangement drawings.
2. Relative humidity is not controlled except in the main control room.

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Title: Changes to AP1000 Design Control Document (DCD) Chapter 3.11 – Environmental Qualification of Mechanical and Electrical Equipment and Chapter 3 Appendix 3D – Methodology for Qualifying AP1000 Safety Related Electrical and Mechanical Equipment

Change 3D-6:

Table 3D.5-4

ABNORMAL OPERATING ENVIRONMENTS OUTSIDE CONTAINMENT

Conditions/Parameter	Abnormal Extreme	Duration	Notes
Zones ~~1,~~4, 5, 6, 7, 8, 9, 10	Same as normal		
Zone 2 - Loss of HVAC- (I&C Rooms, DC Equipment Rooms)			Note 4
Temperature	Figure 3D.5-1 (Sheets 2~~, 3~~)	7 days	Note 3
Pressure	Atmospheric		
Humidity	~~65~~40 - 95%		Note 2
Radiation	Same as normal		
Chemistry	None		
Submergence	None		
Zone 3 - Loss of HVAC - (Main Control Room)			
Temperature	Figure 3D.5-1 (Sheet 1)	7 days	
Pressure	Atmospheric		Note 1
Humidity	~~65~~60 - 95%		Note 2
Radiation	Same as normal		
Chemistry	None		
Submergence	None		
Zone 11 - Loss of AC Power - (Fuel Handling Area)			
Temperature	212°F maximum		
Pressure	Atmospheric		Note 5
Humidity	100%		
Chemistry	None		
Duration	2 weeks		

Notes:

1. Main control room air pressure is maintained above a nominal value of atmospheric during accident conditions to prevent radioactive contaminant entry.
2. ~~Initially, relative humidity is taken to be 65 percent, with gradual increase to a maximum value of 95 percent at 72 hours.~~ Figures 3D.5-1 sheet 1 and 2 have two curves post 72 hrs. The high curve represents the introduction of outside air that is high temperature, low humidity. The low curve represents the introduction of outside air that is low temperature, high humidity. The EQ program will include both of these extremes.
3. Test environments resulting from rooms with equipment supplied by 24 and 72-hour batteries are shown on Sheet 2 for the DC equipment rooms 12203 and 12207 ~~and Sheet 3~~ for the I&C rooms 12302 and 12304. The 24-hour battery is disconnected at 24 hours. The 72-hour battery is not disconnected. Environments resulting from rooms with equipment supplied by 24-hour batteries only, i.e., DC equipment rooms 12201 and 12205 and I&C rooms 12301 and 12305 are enveloped by the environments shown on Sheets 2~~ and 3~~.
4. Abnormal environments in other rooms within Zone 2 are the same as normal.
5. A relief panel is designed to open when the fuel handling area temperature exceeds 165°F.

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Title: Changes to AP1000 Design Control Document (DCD) Chapter 3.11 – Environmental Qualification of Mechanical and Electrical Equipment and Chapter 3 Appendix 3D – Methodology for Qualifying AP1000 Safety Related Electrical and Mechanical Equipment

Change 3D-6:

Original Revision 15 Figure 3D.5-1 Sheet 1:

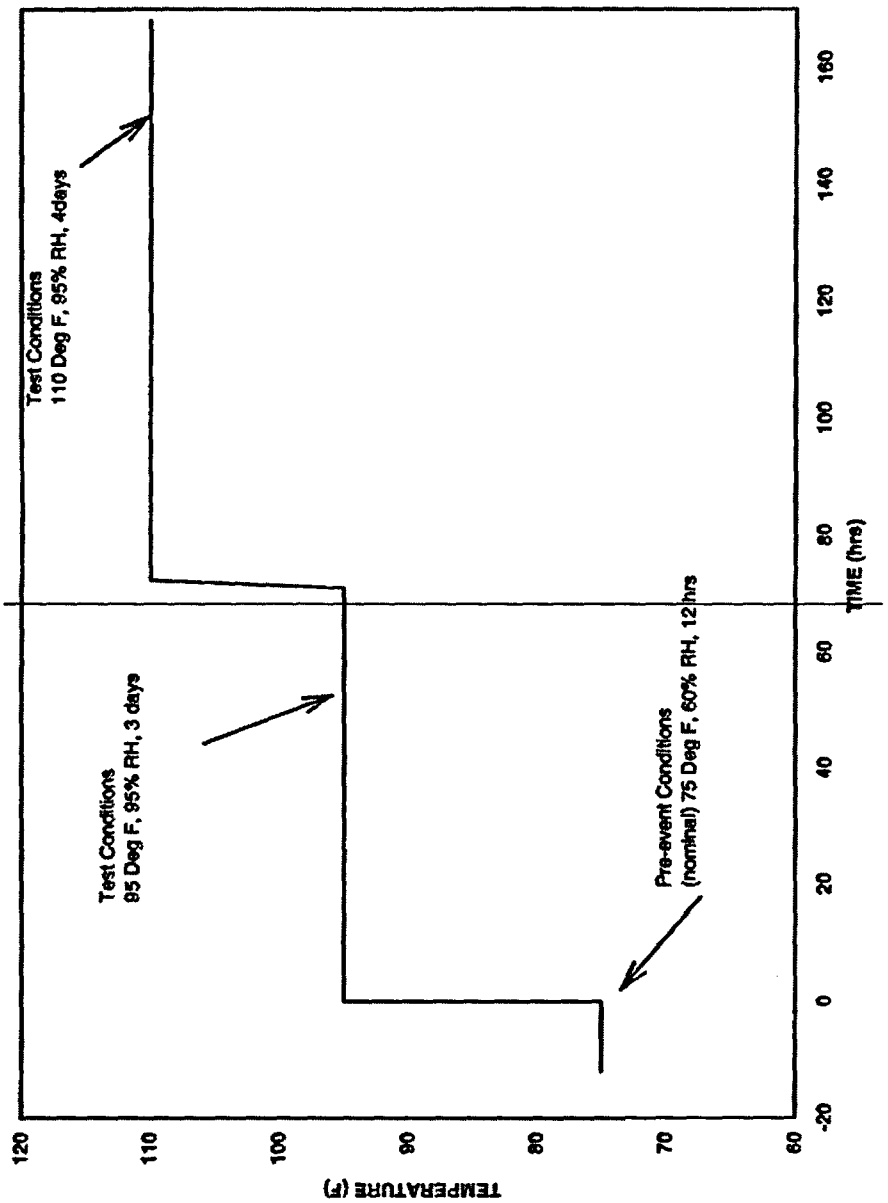

Figure 3D.5-1 (Sheet 1 of 4)

Typical Abnormal Environmental Test Profile: Main Control Room

Document Number: APP-GW-GLN-110 **Revision Number:** 0

Title: Changes to AP1000 Design Control Document (DCD) Chapter 3.11 – Environmental Qualification of Mechanical and Electrical Equipment and Chapter 3 Appendix 3D – Methodology for Qualifying AP1000 Safety Related Electrical and Mechanical Equipment

Change 3D-6:

New Figure 3D.5-1 Sheet 1

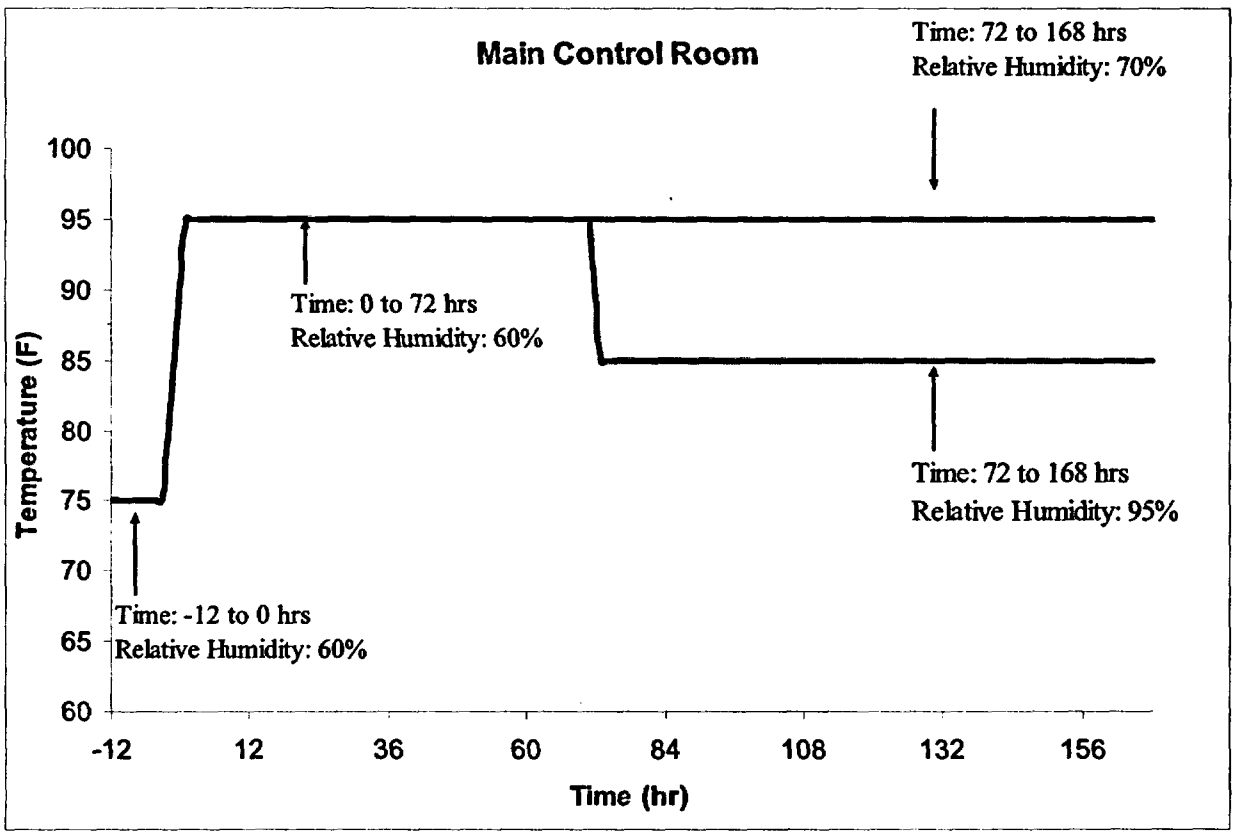

Figure 3D.5-1 (Sheet 1of 3)

Typical Abnormal Environmental Test Profile: Main Control Room

Document Number: APP-GW-GLN-110 **Revision Number:** 0

Title: Changes to AP1000 Design Control Document (DCD) Chapter 3.11 – Environmental Qualification of Mechanical and Electrical Equipment and Chapter 3 Appendix 3D – Methodology for Qualifying AP1000 Safety Related Electrical and Mechanical Equipment

Change 3D-6:

Original Revision 15 Figure 3D.5-1 Sheet 2:

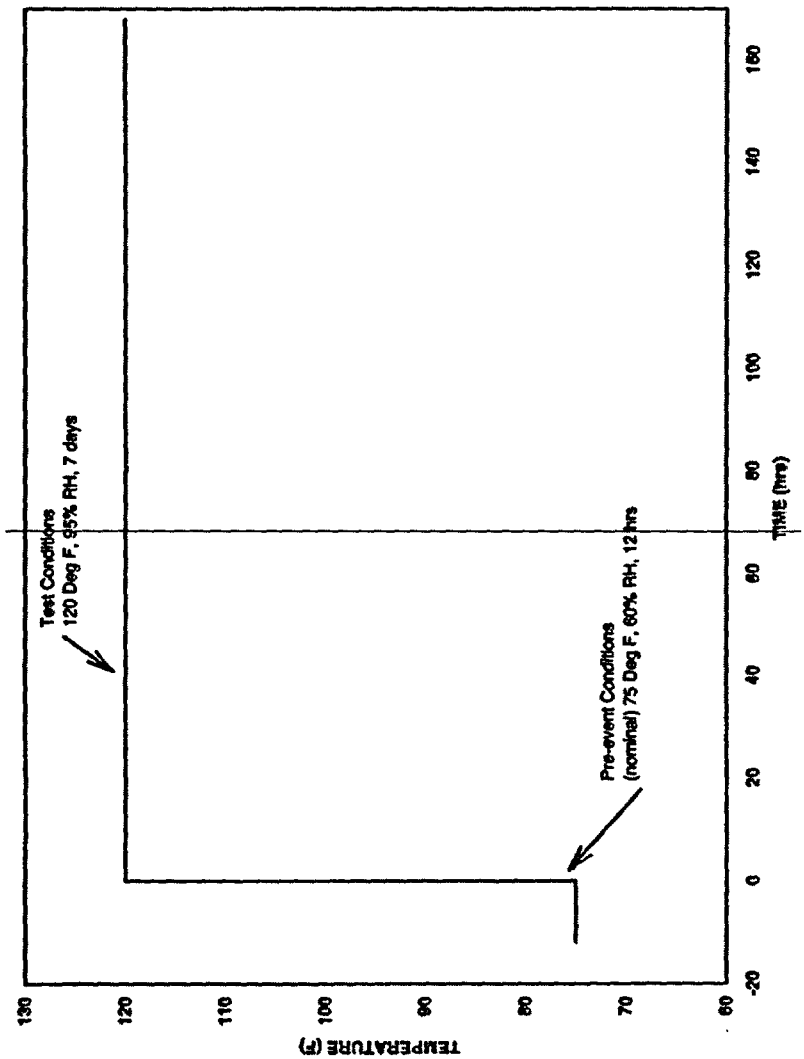

Figure 3D.5-1 (Sheet 2 of 4)

Typical Abnormal Environmental Test Profile:
DC Equipment Rooms 12203 and 12207

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Title: Changes to AP1000 Design Control Document (DCD) Chapter 3.11 – Environmental Qualification of Mechanical and Electrical Equipment and Chapter 3 Appendix 3D – Methodology for Qualifying AP1000 Safety Related Electrical and Mechanical Equipment

Change 3D-6:

New Figure 3D.5-1 Sheet 2:

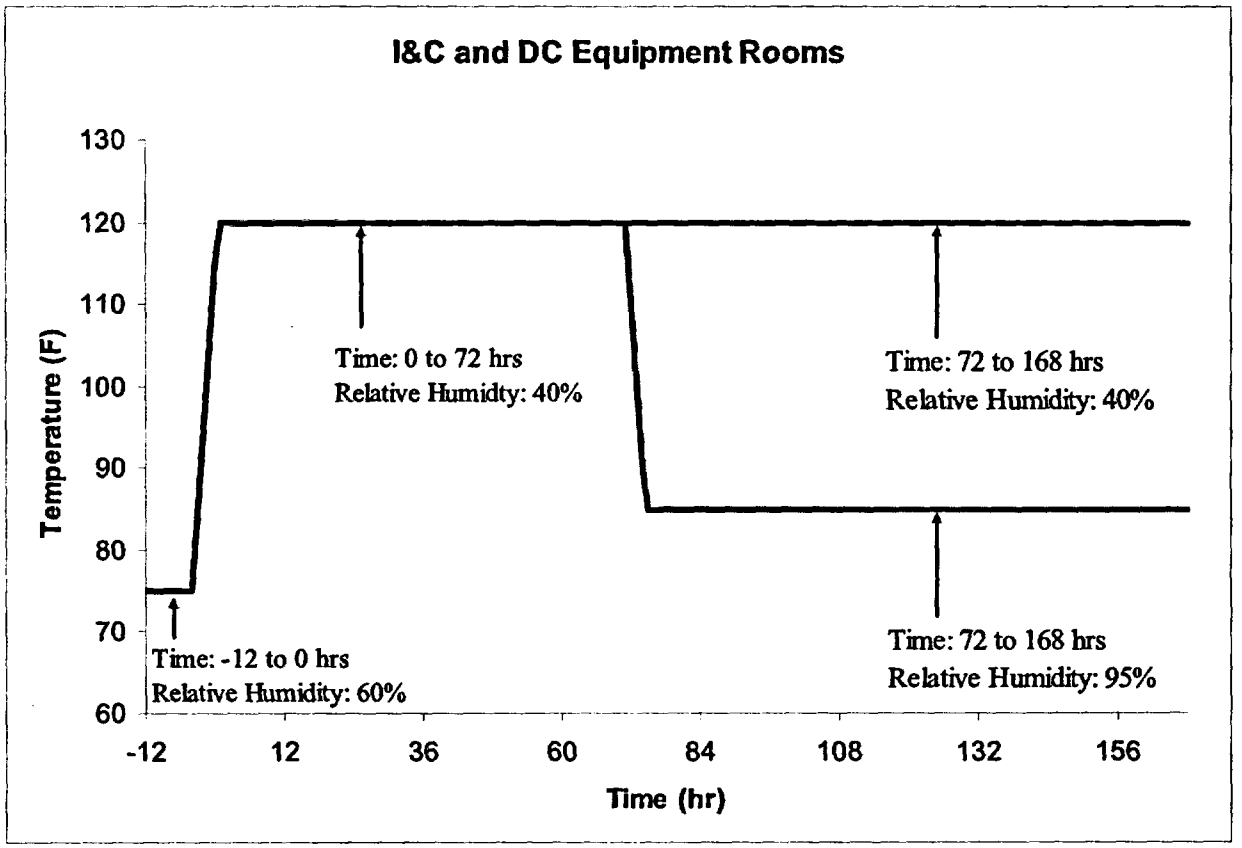


Figure 3D.5-1 (Sheet 2 of 43)

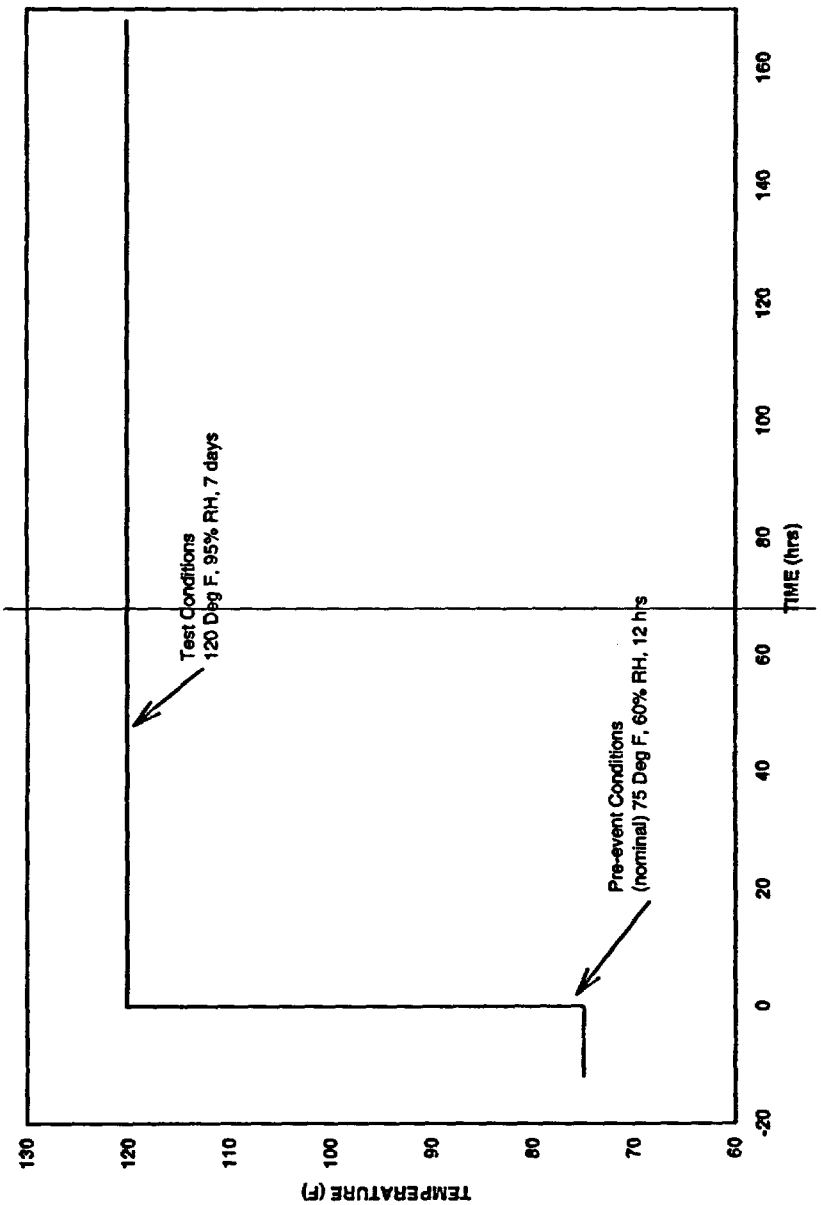
Typical Abnormal Environmental Test Profile:
DC Equipment Rooms 12203 and 12207

Document Number: APP-GW-GLN-110 **Revision Number:** 0

Title: Changes to AP1000 Design Control Document (DCD) Chapter 3.11 – Environmental Qualification of Mechanical and Electrical Equipment and Chapter 3 Appendix 3D – Methodology for Qualifying AP1000 Safety Related Electrical and Mechanical Equipment

Change 3D-6:

Original Revision 15 Figure 3D.5-1 Sheet 3 deleted



2:

~~Figure 3D.5-1 (Sheet 3 of 4)~~

~~**Typical Abnormal Environmental Test Profile: I&C Rooms 12302 and 12304**~~

Document Number: APP-GW-GLN-110 **Revision Number:** 0

Title: Changes to AP1000 Design Control Document (DCD) Chapter 3.11 – Environmental Qualification of Mechanical and Electrical Equipment and Chapter 3 Appendix 3D – Methodology for Qualifying AP1000 Safety Related Electrical and Mechanical Equipment

Change 3D-6:

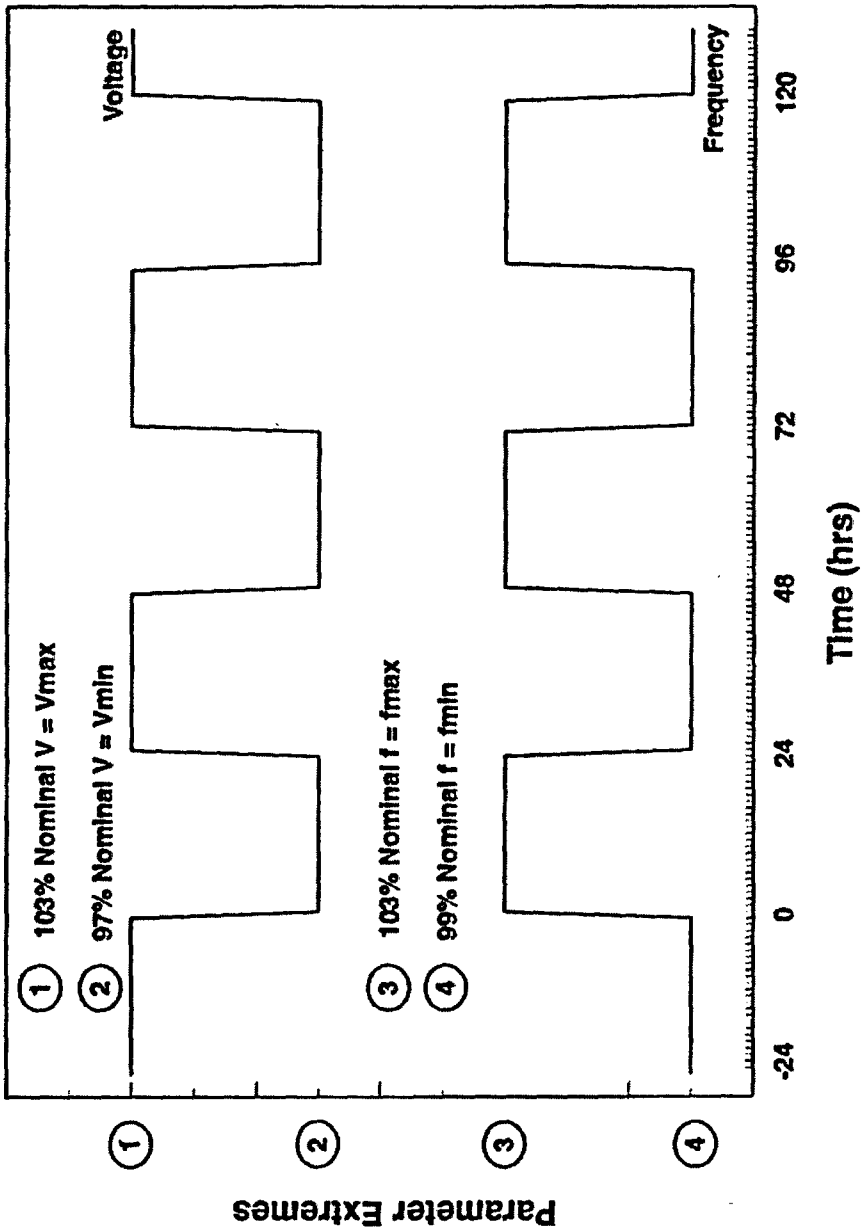


Figure 3D.5-1 (Sheet 43 of 43)

Typical Abnormal Environmental Test Profile: Voltage and Frequency Variations

Document Number: APP-GW-GLN-110 **Revision Number:** 0

Title: Changes to AP1000 Design Control Document (DCD) Chapter 3.11 – Environmental Qualification of Mechanical and Electrical Equipment and Chapter 3 Appendix 3D – Methodology for Qualifying AP1000 Safety Related Electrical and Mechanical Equipment

Change 3D-4:

Original Revision 15 Figure 3D.5-2:

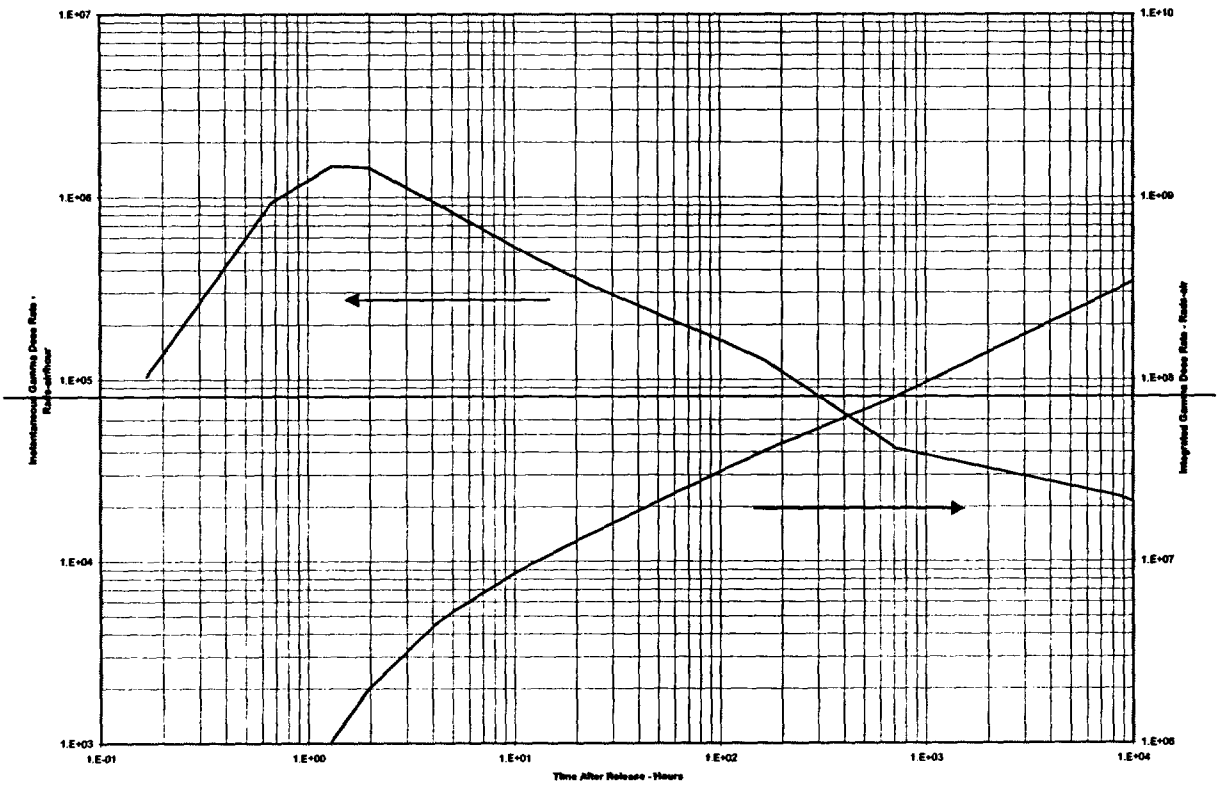


Figure 3D.5-2

Gamma Dose and Dose Rate Inside Containment After a LOCA

Document Number: APP-GW-GLN-110 **Revision Number:** 0

Title: Changes to AP1000 Design Control Document (DCD) Chapter 3.11 – Environmental Qualification of Mechanical and Electrical Equipment and Chapter 3 Appendix 3D – Methodology for Qualifying AP1000 Safety Related Electrical and Mechanical Equipment

Change 3D-4:

New Figure 3D.5-2:

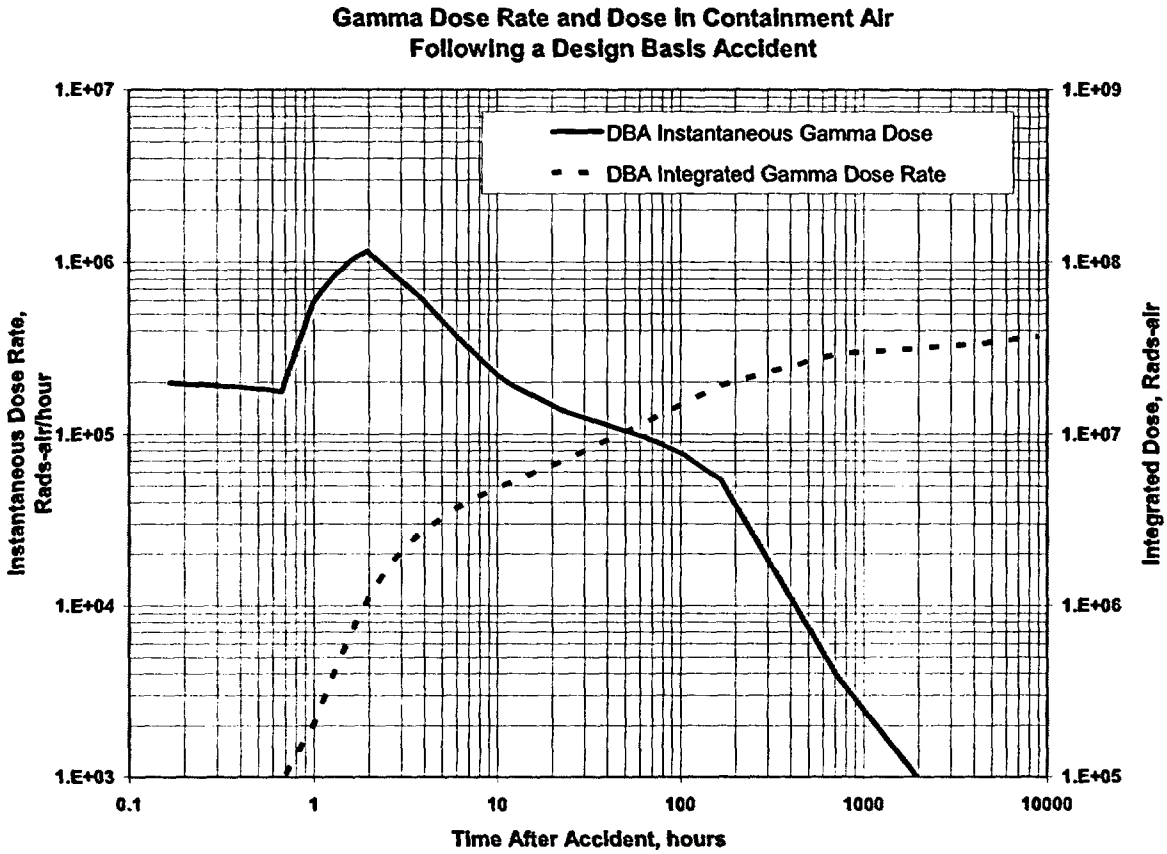


Figure 3D.5-2

Gamma Dose and Dose Rate Inside Containment After a LOCA

Document Number: APP-GW-GLN-110 **Revision Number:** 0

Title: Changes to AP1000 Design Control Document (DCD) Chapter 3.11 – Environmental Qualification of Mechanical and Electrical Equipment and Chapter 3 Appendix 3D – Methodology for Qualifying AP1000 Safety Related Electrical and Mechanical Equipment

Change 3D-4:

Original Revision 15 Figure 3D.5-3:

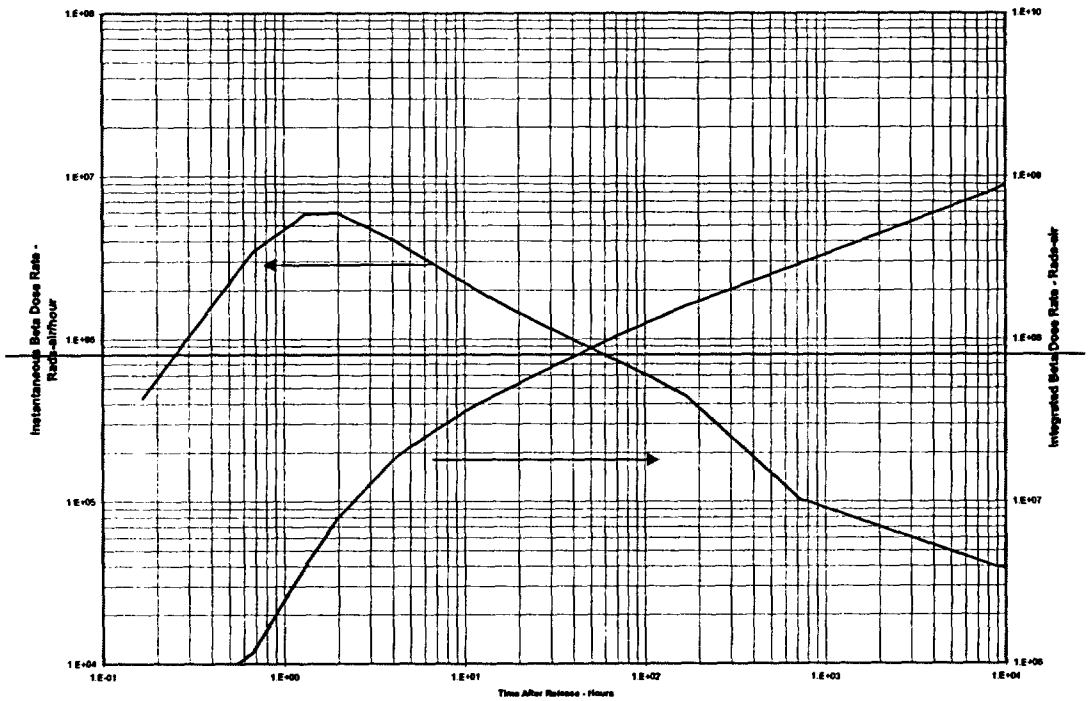


Figure 3D.5-3

Beta Dose and Dose Rate Inside Containment After a LOCA

Document Number: APP-GW-GLN-110 **Revision Number:** 0

Title: Changes to AP1000 Design Control Document (DCD) Chapter 3.11 – Environmental Qualification of Mechanical and Electrical Equipment and Chapter 3 Appendix 3D – Methodology for Qualifying AP1000 Safety Related Electrical and Mechanical Equipment

Change 3D-4:

New Figure 3D.5-3:

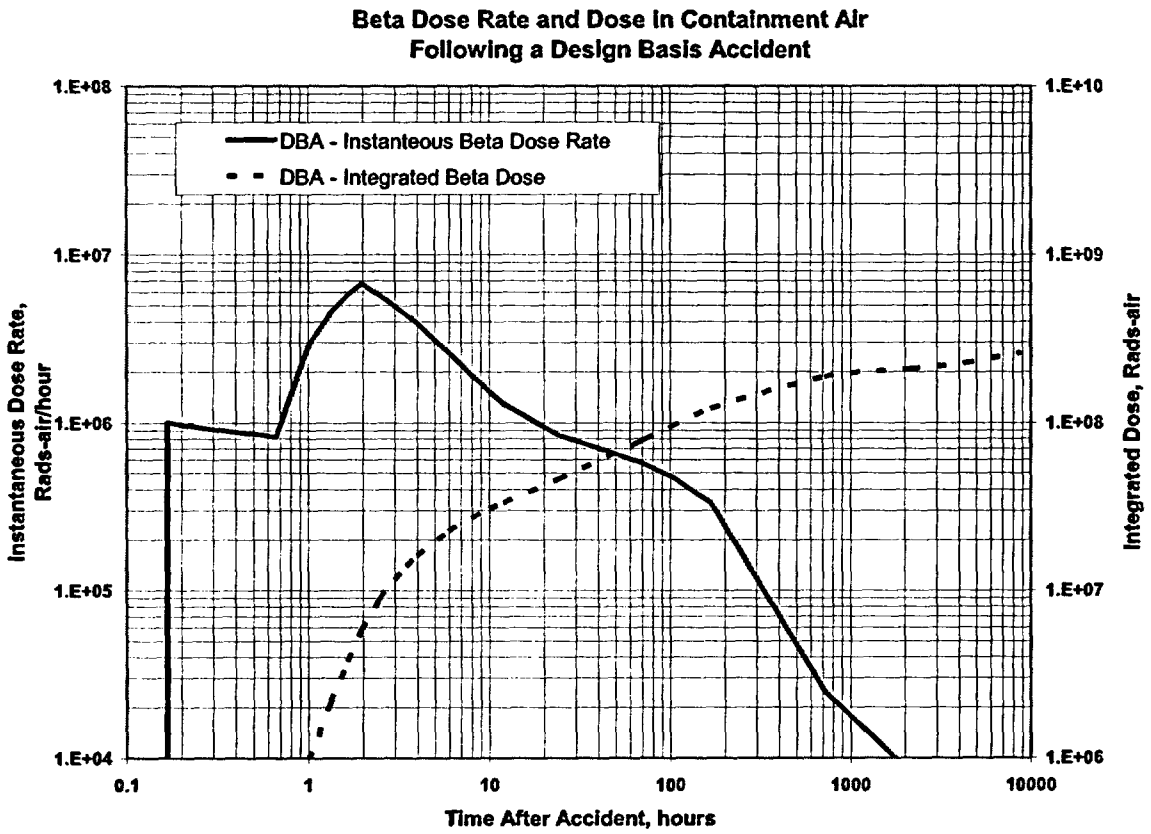


Figure 3D.5-3

Beta Dose and Dose Rate Inside Containment After a LOCA

Document Number: APP-GW-GLN-110 **Revision Number:** 0

Title: Changes to AP1000 Design Control Document (DCD) Chapter 3.11 – Environmental Qualification of Mechanical and Electrical Equipment and Chapter 3 Appendix 3D – Methodology for Qualifying AP1000 Safety Related Electrical and Mechanical Equipment

Change 3D-4:

Original Revision 15 Figure 3D.5-4:

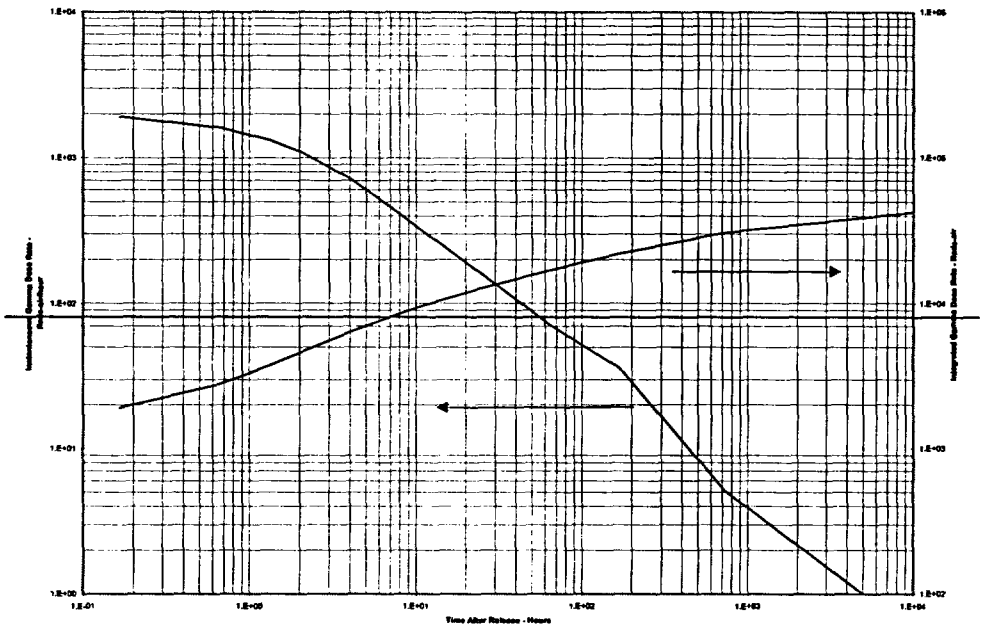


Figure 3D.5-4

Gamma Dose and Dose Rate Inside Containment After a Steam Line Break

Document Number: APP-GW-GLN-110 **Revision Number:** 0

Title: Changes to AP1000 Design Control Document (DCD) Chapter 3.11 – Environmental Qualification of Mechanical and Electrical Equipment and Chapter 3 Appendix 3D – Methodology for Qualifying AP1000 Safety Related Electrical and Mechanical Equipment

Change 3D-4:

New Figure 3D.5-4:

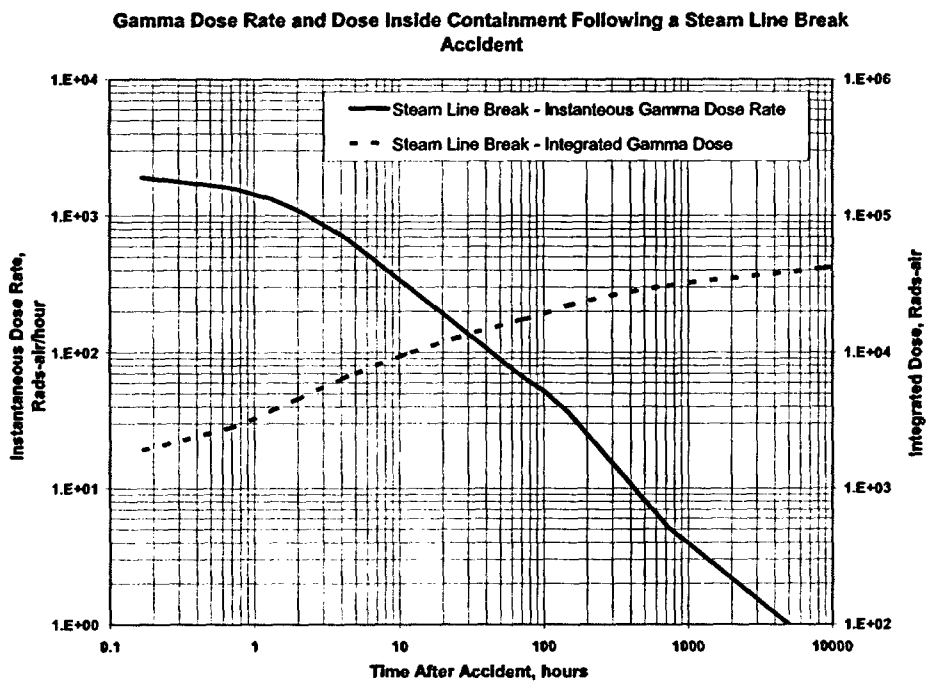


Figure 3D.5-4

Gamma Dose and Dose Rate Inside Containment After a Steam Line Break

Document Number: APP-GW-GLN-110 **Revision Number:** 0

Title: Changes to AP1000 Design Control Document (DCD) Chapter 3.11 – Environmental Qualification of Mechanical and Electrical Equipment and Chapter 3 Appendix 3D – Methodology for Qualifying AP1000 Safety Related Electrical and Mechanical Equipment

Change 3D-4:

Original Revision 15 Figure 3D.5-5:

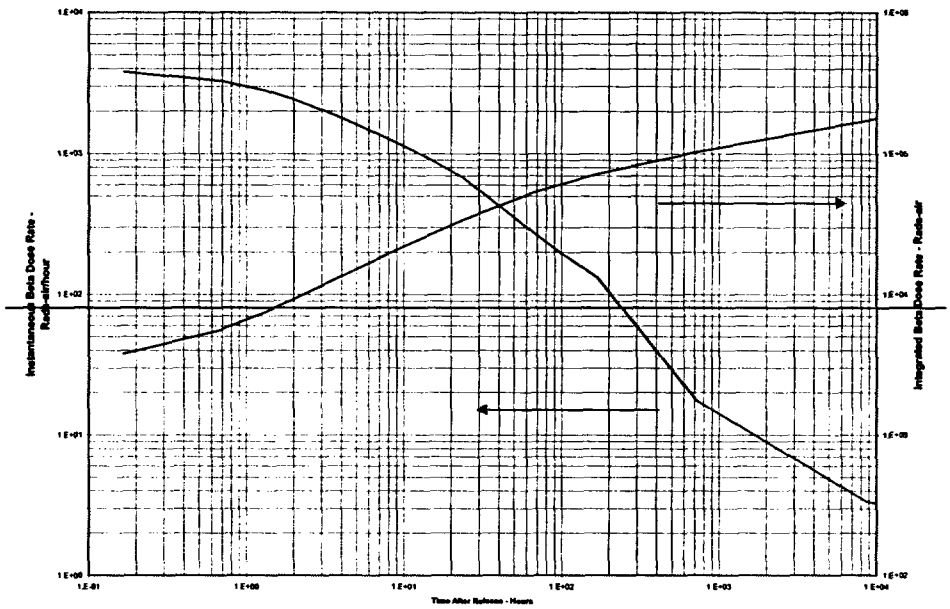


Figure 3D.5-5

Beta Dose and Dose Rate Inside Containment After a Steam Line Break

Document Number: APP-GW-GLN-110 **Revision Number:** 0

Title: Changes to AP1000 Design Control Document (DCD) Chapter 3.11 – Environmental Qualification of Mechanical and Electrical Equipment and Chapter 3 Appendix 3D – Methodology for Qualifying AP1000 Safety Related Electrical and Mechanical Equipment

Change 3D-4:

New Figure 3D.5-5:

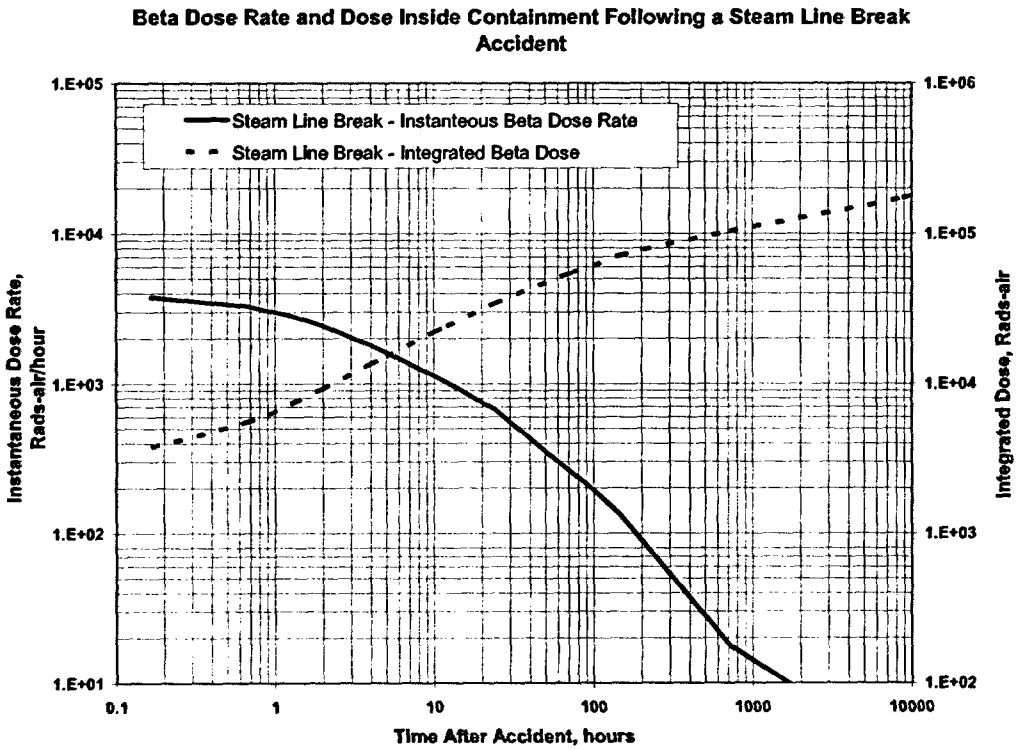


Figure 3D.5-5

Beta Dose and Dose Rate Inside Containment After a Steam Line Break

Document Number: APP-GW-GLN-110 **Revision Number:** 0

Title: Changes to AP1000 Design Control Document (DCD) Chapter 3.11 – Environmental Qualification of Mechanical and Electrical Equipment and Chapter 3 Appendix 3D – Methodology for Qualifying AP1000 Safety Related Electrical and Mechanical Equipment

Change 3D-7:

Original Revision 15 Figure 3D.5-8 (Sheet 1):

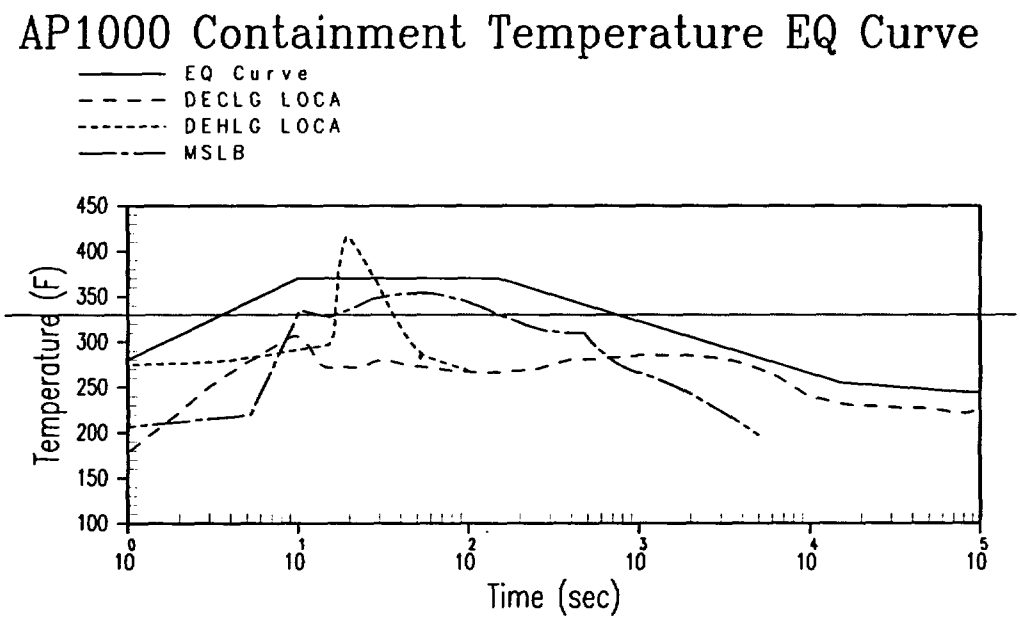


Figure 3D.5-8 (Sheet 1 of 2)

Typical Combined LOCA/SLB/FLB Inside Containment Temperature Test Envelope

Document Number: APP-GW-GLN-110 **Revision Number:** 0

Title: Changes to AP1000 Design Control Document (DCD) Chapter 3.11 – Environmental Qualification of Mechanical and Electrical Equipment and Chapter 3 Appendix 3D – Methodology for Qualifying AP1000 Safety Related Electrical and Mechanical Equipment

Change 3D-7:

New Figure 3D.5-8 (Sheet 1):

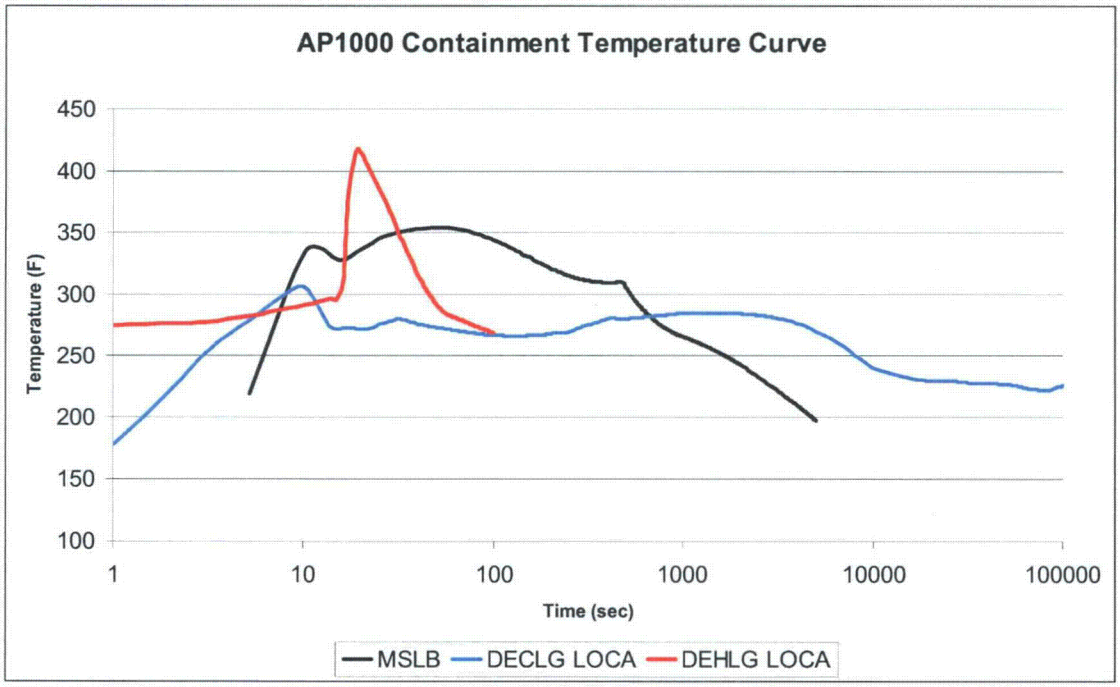


Figure 3D.5-8 (Sheet 1 of 2)

Typical Combined LOCA/SLB/FLB Inside Containment Temperature

Document Number: APP-GW-GLN-110 **Revision Number:** 0

Title: Changes to AP1000 Design Control Document (DCD) Chapter 3.11 – Environmental Qualification of Mechanical and Electrical Equipment and Chapter 3 Appendix 3D – Methodology for Qualifying AP1000 Safety Related Electrical and Mechanical Equipment

Change 3D-7:

Original Revision 15 Figure 3D.5-8 (Sheet 2):

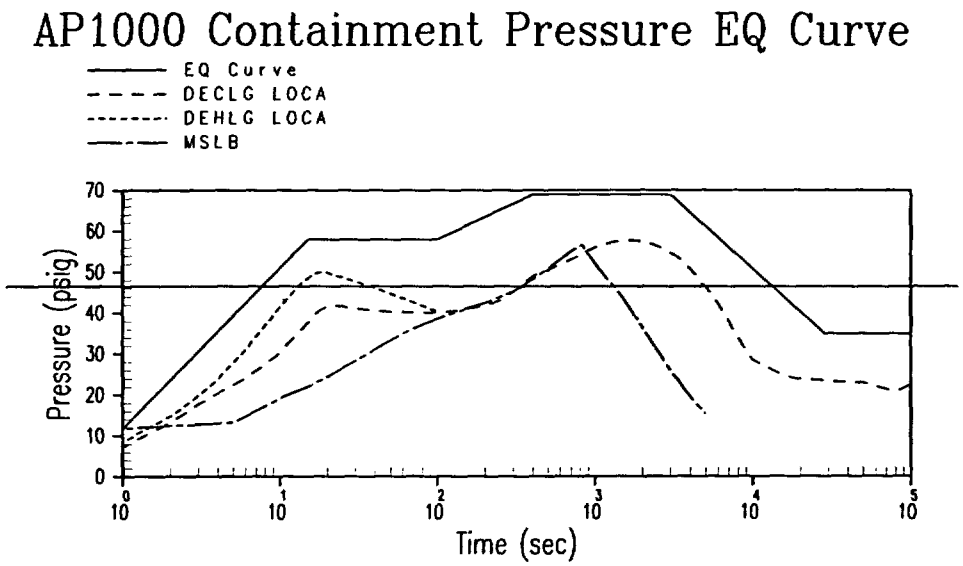


Figure 3D.5-8 (Sheet 2 of 2)

Typical Combined LOCA/SLB/FLB Inside Containment Pressure Test Envelope

Document Number: APP-GW-GLN-110 **Revision Number:** 0

Title: Changes to AP1000 Design Control Document (DCD) Chapter 3.11 – Environmental Qualification of Mechanical and Electrical Equipment and Chapter 3 Appendix 3D – Methodology for Qualifying AP1000 Safety Related Electrical and Mechanical Equipment

Change 3D-7:

New Figure 3D.5-8 (Sheet 2):

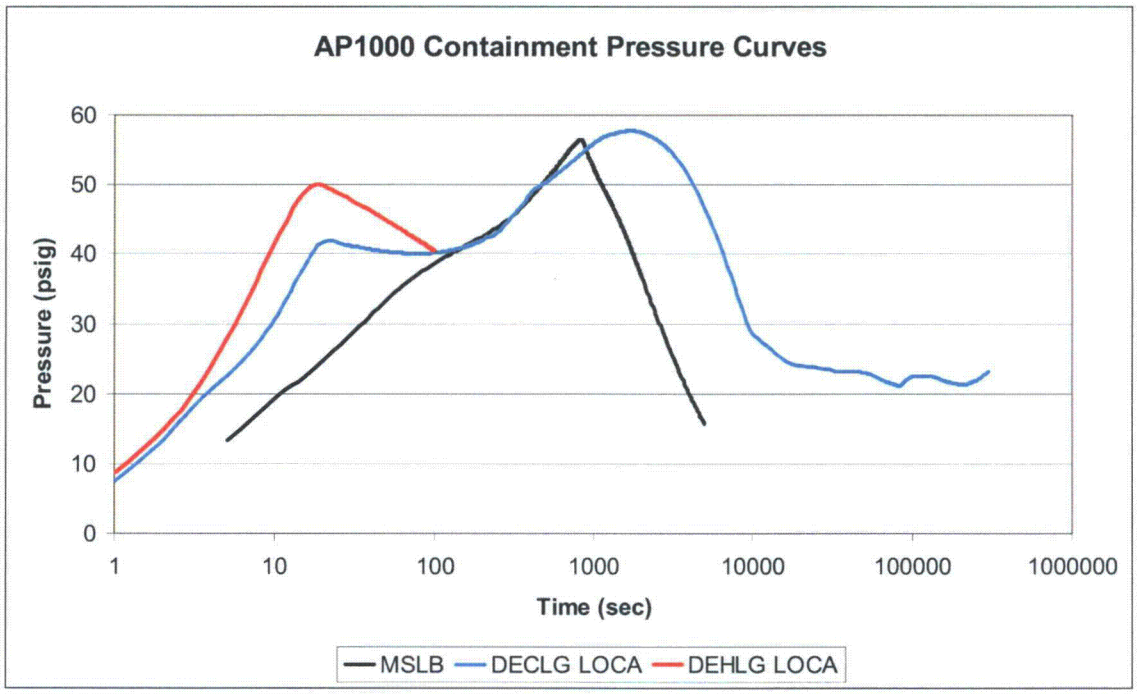


Figure 3D.5-8 (Sheet 2 of 2)

Typical Combined LOCA/SLB/FLB Inside Containment Pressure

Document Number: APP-GW-GLN-110 **Revision Number:** 0

Title: Changes to AP1000 Design Control Document (DCD) Chapter 3.11 – Environmental Qualification of Mechanical and Electrical Equipment and Chapter 3 Appendix 3D – Methodology for Qualifying AP1000 Safety Related Electrical and Mechanical Equipment

Change 3D-3:

Original Revision 15 Figure 3D.5-9:

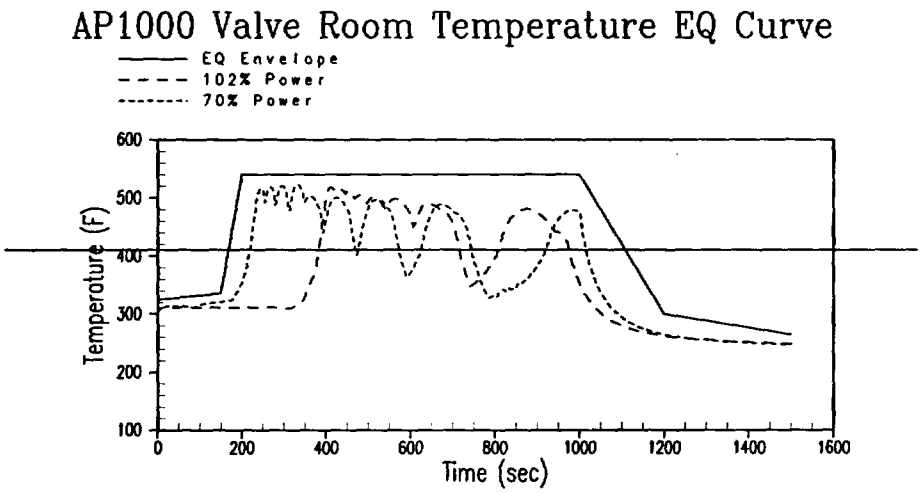


Figure 3D.5-9

Outside Containment Temperature Test Envelope

Document Number: APP-GW-GLN-110 **Revision Number:** 0

Title: Changes to AP1000 Design Control Document (DCD) Chapter 3.11 – Environmental Qualification of Mechanical and Electrical Equipment and Chapter 3 Appendix 3D – Methodology for Qualifying AP1000 Safety Related Electrical and Mechanical Equipment

Change 3D-3:

New Figure 3D.5-9 (Sheet 1):

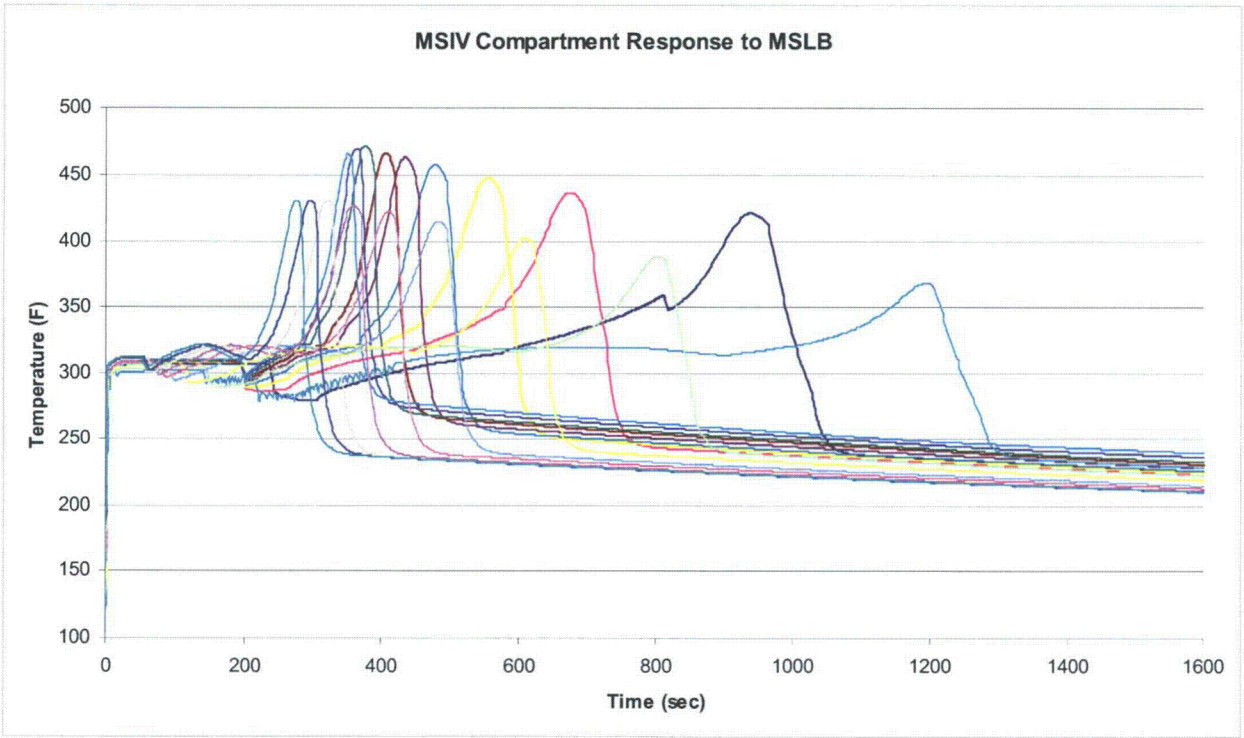


Figure 3D.5-9 (Sheet 1 of 2)

MSIV Compartment Response to MSLB (Short Term)

Document Number: APP-GW-GLN-110 Revision Number: 0

Title: Changes to AP1000 Design Control Document (DCD) Chapter 3.11 – Environmental Qualification of Mechanical and Electrical Equipment and Chapter 3 Appendix 3D – Methodology for Qualifying AP1000 Safety Related Electrical and Mechanical Equipment

Change 3D-3:

New Figure 3D.5-9 (Sheet 2 (New)):

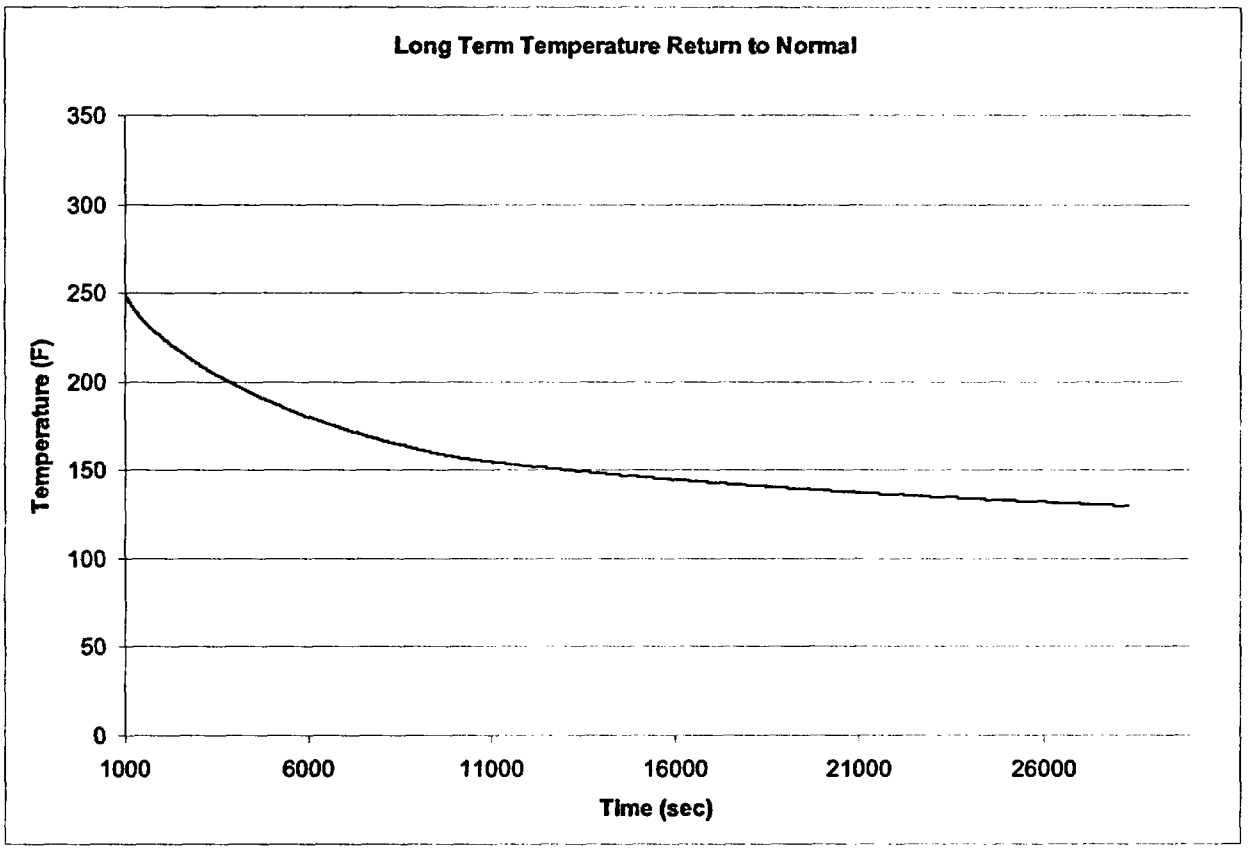


Figure 3D.5-9 (Sheet 2 of 2)

MSIV Compartment Response to MSLB (Long Term)

Document Number: APP-GW-GLN-110 **Revision Number:** 0

Title: Changes to AP1000 Design Control Document (DCD) Chapter 3.11 – Environmental Qualification of Mechanical and Electrical Equipment and Chapter 3 Appendix 3D – Methodology for Qualifying AP1000 Safety Related Electrical and Mechanical Equipment

Change 3D-1:

Table 3D.C-1 (Sheet 2 of 2)

RADIATION-INDUCED DEGRADATION OF MATERIAL MECHANICAL PROPERTIES

Material	Mechanical Damage	Threshold Dose for Comments
Plastic (Continued)		
Kynar (400)	10^7 rads(C)	
Acrylics	8.2×10^5 rads	
Amino Resins	10^6 rads	
Aromatic Amide-Imide	10^7 rads	
Resins	10^7 rads	
Cellulose Derivatives	3×10^7 rads	25% damage
Polyester, Glass Filled	8.7×10^8 rads	
Phenolics	3×10^8 rads(C)	25% damage
Silicones	10^8 rads(C)	
Polycarbonate Resins	5×10^7 rads	25% damage to elongation
Polyesters	~ 10^5 - 10^6 rads	
Styrene Polymers	4×10^7 rads(C)	
Styrene Copolymers	4×10^7 rads(C)	25% damage
Vinyl Polymers	$1.4 \times 10^6 - 8.8 \times 10^7$ rads(C)	
Vinyl Copolymers	$1.4 \times 10^6 - 8.8 \times 10^7$ rads(C)	
Encapsulating Compounds		
RTV 501	2×10^6 rads	
Sylgard 182	2×10^6 rads	
Sylgard 1383	2×10^6 rads	
Polyurethane Foam	2×10^6 rads	
Epoxies	10^9 rads	

Document Number: APP-GW-GLN-110 **Revision Number:** 0

Title: Changes to AP1000 Design Control Document (DCD) Chapter 3.11 – Environmental Qualification of Mechanical and Electrical Equipment and Chapter 3 Appendix 3D – Methodology for Qualifying AP1000 Safety Related Electrical and Mechanical Equipment

Change 3D-1:

D.2 Arrhenius Model

If an aging mechanism is governed by a single chemical reaction, the rate of which is dependent on temperature alone, the Arrhenius equation can be used as the basis for establishing the accelerated aging parameters:

$$\frac{dR}{dt} = Ae^{\frac{-E}{kT}} \quad (1)$$

where:

E = activation energy (eV)
k = Boltzmann's constant (~~8.62~~ 8.617x10^{-5} eV/K)
A = constant factor
T = material temperature (K)
$\frac{dR}{dt}$ = reaction rate = aging rate

Integration gives:

$$\Delta R = Be^{\frac{-E}{kT}} \Delta t \quad (2)$$

where:

ΔR = change in measured property due to aging
Δt = time for aging effect ΔR to occur
B = constant factor

If the accelerated aging process employed correctly simulates the change in properties due to aging under normal operating or post-accident temperature conditions, then:

$$\Delta R_1 = \Delta R_0 \quad (3)$$

and

$$B T_1 e^{\frac{-E}{kT_1}} = B T_0 e^{\frac{-E}{kT_0}}$$

$$B t_1 e^{\frac{-E}{kT_1}} = B t_0 e^{\frac{-E}{kT_0}}$$

and

$$\cancel{\mathrm{Ln}\, t_1} = \frac{-E}{k}\frac{T_1 - T_0}{T_1 T_0}$$

$$\mathrm{Ln}\, t_1 = \frac{-E}{k}\frac{T_1 - T_0}{T_1 T_0} + \mathrm{Ln}\, t_0$$

where:

T_1 = accelerated aging material temperature (K)
t_1 = time at temperature T1
T_0 = material temperature under normal operating or post-accident conditions (K)
t_0 = time at temperature T0

From Equation 3, given an activation energy (E) for the material, the time required at any selected elevated temperature can be calculated to simulate the ambient aging effects.

This model has been verified to represent the thermal aging characteristics of nonmetallic and non-ceramic materials and is employed in the AP1000 equipment qualification program to derive accelerated thermal aging parameters. The only material dependent parameter input into this model, when establishing the accelerated aging parameters, is the activation energy. This parameter is a direct measure of the chemical reaction rate governing the thermal degradation of the material.

Document Number: APP-GW-GLN-110 **Revision Number:** 0

Title: Changes to AP1000 Design Control Document (DCD) Chapter 3.11 – Environmental Qualification of Mechanical and Electrical Equipment and Chapter 3 Appendix 3D – Methodology for Qualifying AP1000 Safety Related Electrical and Mechanical Equipment

Change 3D-2

Chapter 1, Appendix 1A, Page 1A-15:

Reg. Guide 1.33, Rev. 2, 2/78 – Quality Assurance Program Requirements (Operation)

General	ANSI N18.7-1976 ANS-3.2	N/A	Not applicable to AP1000 design certification. This is the Combined License applicant's responsibility. See Section 17.5 for the Combined License information item. In Appendix 3D Regulatory Guide 1.33 is used in a specific manner for determining documentation adequacy in regard to the on-going qualification method based on the assumption that utility programs are in conformance with Regulatory Guide 1.33.

Document Number: APP-GW-GLN-110 **Revision Number:** 0

Title: Changes to AP1000 Design Control Document (DCD) Chapter 3.11 – Environmental Qualification of Mechanical and Electrical Equipment and Chapter 3 Appendix 3D – Methodology for Qualifying AP1000 Safety Related Electrical and Mechanical Equipment

IV. REGULATORY IMPACT

A. FSER IMPACT

These changes have no impact on the text or conclusions of the AP1000 FSER.

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 proposed changes do not involve a change to an SSC that adversely affects a DCD described design function.

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 proposed changes do not involve a change to a procedure that adversely affects how DCD described SSC design functions are performed or controlled.

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 proposed changes do not involve revising or replacing a DCD described evaluation methodology that is used in establishing the design bases or used in the safety analyses.

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 proposed changes do not involve a test or experiment not described in the DCD.

Document Number: APP-GW-GLN-110 **Revision Number:** 0

Title: Changes to AP1000 Design Control Document (DCD) Chapter 3.11 – Environmental Qualification of Mechanical and Electrical Equipment and Chapter 3 Appendix 3D – Methodology for Qualifying AP1000 Safety Related Electrical and Mechanical Equipment

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 changes described will not increase the frequency of occurrence of an accident because there is no significant increase in the probability of failure of the safety functions due to the design changes.

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

   There are no changes which will cause an increase in the probability of an occurrence of a malfunction of any SSC important to the safety and previously evaluated in the plant specific DCD.

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 changes have no effect on the operation, performance, and pressure boundary integrity of the containment vessel. Therefore, there is no increase in the calculated release of radioactive material during postulated accident conditions.

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 changes have no effect on the design functions or reliability of an SSC. Therefore there is no increase in the calculated release of radioactive material due to a malfunction of an SSC.

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 changes have no effect on the operation, performance and pressure boundary integrity of the containment vessel. The changes do not introduce any additional failure modes. Therefore, these changes will not result in an accident of a type different than what has already been evaluated in the DCD.

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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 changes have no effect on the design functions of an SSC. Therefore, there are no additional failure modes or the possibility for a malfunction of an SSC important to safety with a different result than evaluated previously.

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

   There is no change to the design function of an SSC. Therefore, the proposed departure result does not result in a design basis limit for a fission product barrier as described in the plant-specific DCD being exceeded.

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 methods of evaluation for the SSCs described in the plant-specific DCD are not altered by the proposed departure.

☒ 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 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

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☒ 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 design changes will not alter barriers or alarms that control access to protected areas of the plant. The changes will not alter requirements for security personnel.