MITSUBISHI HEAVY INDUSTRIES, LTD.
16-5, KONAN 2-CHOME, MINATO-KU
TOKYO, JAPAN

July 10, 2009

Document Control Desk
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

Attention: Mr. Jeffrey A. Ciocco

Docket No. 52-021
MHI Ref: UAP-HF-09371

Subject: MHI's Response to US-APWR DCD RAI No. 358-2642 Rev. 1

References: 1) "Request for Additional Information No. 358-2642 Revision 1, SRP Section: 03.11 – Environmental Qualification of Mechanical and Electrical Equipment, Application Section: 3.11," dated May 13, 2009

With this letter, Mitsubishi Heavy Industries, Ltd. ("MHI") transmits to the U.S. Nuclear Regulatory Commission ("NRC") a document entitled "Response to Request for Additional Information No.358-2642 Revision 1".

Enclosed is the response to five RAIs contained within Reference 1.

Please contact Dr. C. Keith Paulson, Senior Technical Manager, Mitsubishi Nuclear Energy Systems, Inc. if the NRC has questions concerning any aspect of the submittal. His contact information is below.

Sincerely,

Y. Ogata

Yoshiki Ogata
General Manager- APWR Promoting Department
Mitsubishi Heavy Industries, LTD.

Enclosure:

1. Response to Request for Additional Information No.358-2642 Revision 1

CC: J. A. Ciocco
C. K. Paulson

Contact Information
C. Keith Paulson, Senior Technical Manager
Mitsubishi Nuclear Energy Systems, Inc.
300 Oxford Drive, Suite 301
Monroeville, PA 15146
E-mail: ck_paulson@mnes-us.com
Telephone: (412) 373-6466

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Docket No. 52-021
MHI Ref: UAP-HF-09371

Enclosure 1

UAP-HF-09371
Docket No. 52-021

Response to Request for Additional Information
No. 358-2642 Revision 1

July, 2009

RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION

7/10/2009

US-APWR Design Certification

Mitsubishi Heavy Industries

Docket No. 52-021

RAI NO.:	**NO. 358-2462 REVISION 1**
SRP SECTION:	**03.11 – Environmental Qualification of Mechanical and Electrical Equipment**
APPLICATION SECTION:	**3.11**
DATE OF RAI ISSUE:	**5/13/2009**

QUESTION NO.: 03.11-1

Sections 10 CFR 50.49 and 10 CFR 52.79 require licensees to develop an Environmental Qualification program for equipment important to safety. SRP Section 3.11 notes that the applicant is to provide the conceptual approach, including the environmental design bases for identified equipment. SRP Section 3.11 and Regulatory Guide 1.206 note that applicant should identify equipment located in harsh environments. They further note that the radiation environment must be based on the integrated effects of the normally expected radiation environment over the equipment's installed life, plus the effects associated with the most severe design basis event (DBE) during or following which the equipment is required to remain functional.

SRP Section 3.11 and Regulatory Guide 1.206 note that Regulatory Guide 1.183 provides guidance for determining radiation dose rate and dose for equipment during events. Radiation doses used for the qualification of equipment as discussed in NUREG-0737 II.B.2, must be based on an NRC staff approved methodology. Regulatory Guide 1.183 Appendix I, "Assumptions for Evaluating Radiation Doses for Equipment Qualifications" provides guidance for the methodology to determine the radiation environment for equipment inside and outside containment. Please describe to the calculation methods, models and assumptions used to support the radiological Total Integrated Dose (TID) to equipment, for the following conditions:

1. The US-APWR FSAR Tier 2, Chapter 3, Appendix 3D, Section 3D.1.7 notes that equipment radiation doses for accidents are determined by the analytical codes as described in the US-APWR FSAR Tier 2 Chapter 15. The US-APWR MUAP-08015(R0) "Equipment Environmental Qualification Program" Section 5.5.1.1 specifically notes that the guidance of RG 1.183 is incorporated into the dose analysis. However, neither the FSAR Chapter 15, nor Chapter 12 provides a description of the methodology described in RG 1.183 Appendix I, with respect to EQ related doses. Show in FSAR Tier 2 Chapters 12 or 15, the methods, models and assumptions used for calculating doses to equipment, including the dose to equipment immersed in sump fluids and the Beta dose from airborne activity in containment.

2. The US-APWR FSAR Tier 2, Chapter 3, Appendix 3D, Table 3D-2 notes that some equipment in the Main Steam Line area is in a harsh environment. The US-APWR MUAP-08015(R0) "Equipment Environmental Qualification Program" Section 5.5.1.2 "Radiation Environment – Steam Line Break Accident" notes that sources associated with

a Main Steam Line Break (MSLB) accident are based on the release of reactor coolant system activity, assuming operation with the design basis fuel defect level of 1.0 percent. The analysis also assumes that an "event-initiated" iodine activity spike 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. However, neither the FSAR Chapter 15, nor Chapter 12 provides a description of the methods, models and assumptions and the resultant dose rates and radioactivity releases in the Main Steam Line areas outside of containment. Provide the radiological calculations and dose results for a MSLB accident outside containment, and include the resultant information in FSAR Tier 2 Chapters 12 or 15.

3. The USAPWR FSAR Tier 2, Chapter 3, Section 3.11.4 "Loss of Ventilation" notes that equipment in conditioned spaces is evaluated for loss of HVAC type events. Provide in Chapter 3 or Chapter 12 the methods, models, assumptions and results of the TID impact evaluations to equipment due to the loss of HVAC.

In accordance with NUREG-0800, RG-1.206 and RG 1.183, revise US-APWR FSAR Tier 2 to provide the information requested, or provide the specific alternative approaches used and the associated justification.

ANSWER:

Answer to Item 1:
The following is the method we used to calculate the doses to equipments (inside and outside containment, immersed in sump fluids) after LOCA.

(1) Airborne radioactive concentration in containment / radioactive concentration in recirculation water after LOCA

(a) Radioactivity released into containment

As mentioned in 15A.1.1.3, for core inventory calculation, it is assumed that core has 2 regions and irradiation time for a cycle is 28 months, and average specific power is 32.1 MW/MTU, which correspond to burnup of about 55 GWD/MTU in 2 cycles. The core thermal power is 102 % of the design thermal power. Table 15A-10 lists the fission product inventories. The fractions of fission products released into containment are listed in Table 15A-13, which are based on Regulatory Guide 1.183. The radioactivity released into containment is calculated based on the above-mentioned core inventory and release fraction.

(b) Airborne radioactive concentration in containment

The airborne radioactive concentration in containment is calculated based on the radioactivity released into containment and the following assumptions:

- All the radioactive material released into containment is airborne.
- Decreases due to deposit and attachment are not taken into consideration.
- The removal effect by spray is ignored.
- It does not dissolve in recirculation water.

Assuming that radioactive materials are uniformly airborne in containment, the airborne radioactivity is divided by the containment free volume to calculate the airborne radioactive concentration in containment.

(c) Radioactive concentration in recirculation water

The radioactive concentration in the recirculation water is calculated based on the radioactivity released into containment and the following assumptions:

- All the radioactive material released into containment except for noble gas is dissolved in recirculation water.
- Decreases due to deposit and attachment are not taken into consideration.
- There is no airborne material in containment.

Assuming that radioactive materials are uniformly dissolved in recirculation water, the radioactivity is divided by the volume of recirculation water to calculate the radioactive concentration in the recirculation water.

(2) Gamma ray source strength in containment and recirculation water after LOCA
The gamma ray source strengths can be calculated using the point-kernel shielding code Microshield, and also using the airborne radioactive concentration in containment and the radioactive concentration in recirculation water.

(3) Beta ray source strength in containment and recirculation water after LOCA
The beta ray source strengths can be calculated by multiplying the airborne radioactive concentration in containment and the radioactivity in recirculation water by the effective energy of beta ray.

(4) Gamma dose in containment and recirculation water after LOCA
(a) Gamma dose in containment
The gamma dose due to airborne radioactive materials in containment can be calculated using the point-kernel shielding code Microshield. The gamma dose at the center of the source is calculated by using gamma ray source strength in containment and by modeling containment as cylinder with the containment free volume.

(b) Gamma dose in recirculation water
The gamma dose due to dissolved radioactive materials in recirculation water can be calculated using Microshield code. The gamma dose at the center of the source is calculated by using gamma ray source strength in recirculation water and by modeling recirculation water as cylinder with the volume of recirculation water.

(5) Beta dose in containment and recirculation water after LOCA
It is possible to assume containment and recirculation water are an infinite space for beta ray, so that for beta dose calculation the submersion model is adopted. This model is commonly used in cases of uniform distribution of radioactive concentration. That is, the following equation is used together with the airborne radioactive concentration in containment and the radioactive concentration in recirculation water to calculate beta dose.

$$H_\beta = \frac{K \cdot E_\beta}{\rho} \cdot \chi$$

where:

H_β: beta dose (Gy/s)
K: 1.6×10^{-10} ((Gy/s)(dis/MeV)(g/Bq)
E_β: effective energy of beta ray (MeV/dis)
ρ : density of air or water (g/cm^3)
χ : airborne radioactive concentration in containment or that in recirculation water (Bq/cm^3)

(6) Gamma dose outside containment after LOCA
The upper limit doses on the radiation zone maps for plant areas including those areas requiring post-accident access, as shown in Chapter 12 Subsection 12.4.1.8, are used for the

gamma dose outside containment. The doses on the radiation zone maps are determined by adding the upper limit dose on the radiation zone maps under normal conditions to the gamma dose from airborne radioactive materials in containment after LOCA, which are calculated by modeling outer shield and containment as cylinder with the containment free volume. Then the outer shield is ignored in dose calculation of the penetration areas and the other shields having sufficient shielding effect are considered.

Reflection on MUAP-08015 (R0) is following and reflection on DCD is shown in "Impact on DCD"

The first sentence of the second paragraph in Subsection 5.5.1.1 of MUAP-08015 (R0) will be revised to the following:

"Radiation doses associated with postulated accidents are determined by following methods, models and assumptions. Source term calculation methods are described in Chapter 12 Subsection 12.2.1.3.
The gamma dose due to airborne radioactive materials in containment can be calculated using the point-kernel shielding code Microshield. The gamma dose at the center of the source is calculated by using gamma ray source strength in containment and by modeling containment as cylinder with the containment free volume.
The gamma dose due to dissolved radioactive materials in recirculation water can be calculated using the point-kernel shielding code Microshield. The gamma dose at the center of the source is calculated by using gamma ray source strength in recirculation water and by modeling recirculation water as cylinder with the volume of recirculation water.
It is possible to assume containment and recirculation water are an infinite space for beta ray, so that for beta dose calculation the submersion model is adopted. This model is commonly used in cases of uniform distribution of radioactive concentration. That is, the following equation is used together with the airborne radioactive concentration in containment and the radioactive concentration in recirculation water to calculate beta dose.

$$H_\beta = \frac{K \cdot E_\beta}{\rho} \cdot \chi$$

where:

H_β: beta dose (Gy/s)
K: 1.6×10^{-10} ((Gy/s)(dis/MeV)(g/Bq)
E_β: effective energy of beta ray (MeV/dis)
ρ : density of air or water (g/cm^3)
χ : airborne radioactive concentration in containment or that in recirculation water (Bq/cm^3) "

Answer to Item 2:

The volume of the main steam/feedwater piping area is about 109,000 ft^3, while the free volume of the containment is about 2,800,000 ft^3, which is about 30 times that of the main steam/feedwater piping area. The amount of radioactivity released to the main steam/feedwater piping area at the time of a main steam line break (MSLB) is less than $1/30^{th}$ of that released to the containment in the event of a loss of coolant accident (LOCA). Consequently, the concentration of radioactivity in the main steam/feedwater piping area at the time of MSLB is low compared to that inside the containment at the time of LOCA. Thus, it is concluded that the radiological environmental condition will be less severe compared to that inside the containment at the time of LOCA.

The above conclusion is derived from the following discussion, which will also be added to MUAP-08015 Section 5.5.1.2.

Radioactivity in the primary coolant and that in the secondary coolant are taken into consideration as the source term, wherein the initial concentration of radioactivity in the secondary coolant is assumed to be 1/10th of that in the primary coolant.

Also the following iodine spikes are considered:

- Pre-transient iodine spike: 60 μ Ci/g
- Transient-initiated iodine spike: 500 × iodine appearance rate

The amount of radioactivity for pre-transient iodine spike is less than gap radioactivity (1% × 5% of the core inventory). The Regulatory Guide (RG) 1.183 notes that the transient initiated spikes need not be set larger than the available radioactivity for release from the fuel gap of all fuel pins. Thus, the amount of iodine to spike into the primary coolant is set at the amount of iodine in the gap.

Release due to primary-to-secondary leakage is assumed to continue for 14 hr for MSLB as in the case of radiological consequences (See DCD Section 15.1.5.5). The leak rate of 600 gpd results in a leakage of 350 gallons. As primary coolant is 646,000 lbm, about 0.5% of radioactivity in the primary coolant will be released due to leakage from the primary system. It is also assumed that all primary-to-secondary leakage is discharged into the main steam/feedwater piping area.

The contribution due to release from the secondary coolant is taken into account. It is assumed that the total amount of initial radioactivity in the liquid phase of the steam generator (SG) will be released into the main steam/feedwater piping area. The SG water is assumed to be 968,000 lbm which corresponds to 4 SGs at the time of hot zero power. This means the released radioactivity from secondary coolant to the main steam/feedwater piping area is equivalent to about 15% of the radioactivity in the primary coolant. Thus, the total contribution including the primary-to-secondary leakage and secondary coolant is given as release of about 16% of radioactivity in primary coolant, except for noble gas. The noble gas is assumed not to exist in SG.

Since the amount of iodine in gap is 0.05% of core inventory, about 0.0003% of the core inventory is assumed to be released into the main steam/feedwater piping area due to the contribution of iodine spike.

Radioactivity released into the main steam/feedwater piping area during MSLB

	Contribution of radioactivity in primary coolant	Contribution of radioactivity in secondary coolant	Contribution of iodine spike
Noble gas	0.5% of primary coolant	—	—
Iodine	16% of primary coolant		0.0003% of core inventory
Others	16% of primary coolant		—

The radioactivity in primary coolant is sufficiently smaller than core inventory (See Tables 15A-3 and 15A-10). The MSLB radioactivity released into the main steam/feedwater piping area as shown in the above table is less than 1/30th of that released to the containment in the LOCA. Thus, it is concluded that the radiological environmental condition in the main steam/feedwater

piping area at the time of MSLB is less severe compared to that inside the containment at the time of LOCA.

Answer to Item 3:
The HVAC system will be restored as soon as possible after loss of HVAC, so that the integrated dose at the time of loss of HVAC is sufficiently small compared to the current Total Integrated Dose evaluation for 60 years of operation and at the time of accidents. Thus, there is no impact on Total Integrated Dose evaluation for loss of HVAC-type events.

Impact on DCD

The following will be added to the third sentence of the second paragraph of Chapter 12 Subsection 12.2.1.3:

"The airborne radioactivity in containment is calculated based on the assumptions that all the radioactive material released into containment is airborne, decreases due to deposit and attachment and spray, dissolving into recirculation water are not taken into consideration. The gamma ray source strengths can be calculated using Microshield code, and also using the airborne radioactive concentration in containment. The beta ray source strengths can be calculated by multiplying the airborne radioactive concentration in containment by the effective energy of beta ray. "

The following will be added to the third sentence of the third paragraph of Chapter 12 Subsection 12.2.1.3:

"The radioactivity in recirculation water is calculated based on the assumptions that all the radioactive material released into containment except for noble gas is dissolved, decreases due to deposit and attachment, being airborne in containment are not taken into consideration. The gamma ray source strengths can be calculated using Microshield code, and also using the radioactive concentration in recirculation water. The beta ray source strengths can be calculated by multiplying the radioactive concentration in recirculation water by the effective energy of beta ray. "

The following will be added to the twelfth sentence of the first paragraph of Chapter 12 Subsection 12.4.1.8:

"The doses on the radiation zone maps are determined by adding the upper limit dose on the radiation zone maps under normal conditions to the gamma dose from airborne radioactive materials in containment after LOCA, which are calculated by modeling outer shield and containment as cylinder with the containment free volume. Then the outer shield is ignored in dose calculation of the penetration areas and the other shields having sufficient shielding effect are considered. "

The last sentence in Chapter 3 Appendix 3D.1.7 will be revised to the following:

"Radiation doses associated with postulated accidents are determined by the methods, models and assumptions as described in Chapter 12 and 15, and MUAP-08015. Source term calculation methods are described in Chapter 12 Subsection 12.2.1.3 and Chapter 15 Appendix 15A.1.1.3, dose calculation methods are described in Subsection 5.5.1.1 of MUAP-08015 (R0). "

Impact on COLA

There is no impact on the COLA.

Impact on PRA

There is no impact on the PRA.

RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION

7/10/2009

US-APWR Design Certification

Mitsubishi Heavy Industries

Docket No. 52-021

RAI NO.:	**NO. 358-2462 REVISION 1**
SRP SECTION:	**03.11 – Environmental Qualification of Mechanical and Electrical Equipment**
APPLICATION SECTION:	**3.11**
DATE OF RAI ISSUE:	**5/13/2009**

QUESTION NO.: 03.11-2

Sections 10 CFR 50.49 and 10 CFR 52.79 require licensees to develop an Environmental Qualification program for equipment important to safety. SRP Section 3.11 notes that the applicant is to provide the conceptual approach, including the environmental design bases for identified equipment. SRP Section 3.11 and Regulatory Guide 1.206 note that applicant should identify equipment located in harsh environments. They further note that the radiation environment must be based on the integrated effects of the normally expected radiation environment over the equipment's installed life, plus the effects associated with the most severe design basis event (DBE) during or following which the equipment is required to remain functional.

SRP Section 3.11 and Regulatory Guide 1.206 note that applicant should identify equipment located in harsh environments. They further note that the radiation environment is based on the Total Integrated Dose (TID) effects of the normally expected radiation environment over the equipment's installed life, plus the effects associated with the most severe design basis event (DBE) during or following which the equipment is required to remain functional. US-APWR FSAR Tier 2, Chapter 3, Section 3.11.5.2 notes that radiation dose rates and integrated doses of neutrons, beta, and gamma radiation harsh environmental conditions for various plant areas and systems, are presented in Appendix 3D, when in fact, they are not.

1. RG 1.205 C.I.3.11.5 notes that the applicant should indicate whether airborne activity (e.g. containment leak rate or ESF systems) contributes to the estimated dose. The USAPWR FSAR Tier 2 Section 3.11.4 "Loss of Ventilation" notes that equipment in conditioned spaces is evaluated for loss of HVAC type events and that equipment that may be impacted is identified during the design process. Identify in Table 3D-2, which pieces of equipment could have the TID estimate impacted by a loss of HVAC.

2. US-APWR MUAP-08015(R0) "Equipment Environmental Qualification Program" notes that, while generally precluded by design, one of the anticipated environmental conditions is submergence. Identify in Table 3D-2, which pieces of equipment could have the TID estimate impacted by submergence.

3. Regulatory Guide 1.206 CI.3.11.1 indicates that applicant should specify the location of each piece of equipment. US-APWR FSAR Tier 2, Appendix 3D, Table 3D-2 "Environmental Qualification Equipment List" provides only the building containing the

equipment. Due to the limited location description provided, it is not possible to determine accurately the expected TID.
Examples of this include:

a. Table 3D-2 shows RHS-FT-601 the Containment Spray/RHR Discharge Flow is located in a Mild environment, while Figure 12.3-3 Sheet 1 of 10 indicates that the CS/RHR pump is located in a 500 Rad/h area following a DBE.
b. Table 3D-2 shows RHS-TE-624 the CS/RHR Heat Exchanger Outlet Temperature is located in a Mild environment, while Figure 12.3-3 Sheet 1 of 10 indicates that the CS/RHR pump is located in a 500 Rad/h area following a DBE.

Provide sufficient location information in Table 3D-2 to allow an accurate determination of the radiological environment of the listed equipment.

4. Regulatory Guide 1.206 CI.3.11.5 indicates that applicant should provide environmental conditions for each piece of equipment, and specifically mentions listing each type of radiation. US-APWR FSAR Tier 2 Section 3.11.5.2 notes that radiation dose rates and integrated doses of neutrons, beta, and gamma radiation harsh environmental conditions for various plant areas and systems, are presented in Appendix 3D. Chapter 12 only provides a description of neutron exposure associated with the Reactor Vessel. Provide neutron and beta exposure data in Appendix 3D.

5. The US-APWR MUAP-08015(R0) "Equipment Environmental Qualification Program" Table 5-4 contains integrated gamma and beta dose information, for a number of time intervals, including 4 months and 1 year. Provide the supporting data in Chapters 3 or 12 for the 4 month and 1 year time intervals.

In accordance with NUREG-0800, RG-1.206 and RG 1.183, revise US-APWR FSAR Tier 2 to provide the information requested, or provide the specific alternative approaches used and the associated justification.

ANSWER:

Answer to Item 1:
The response to this question is same as the Answer to Item 3 of QUESTION NO.: 03.11-1 of this RAI.

Answer to Item 2:
A column for the Influence of Submergence for Total Integrated Dose will be added to Table 3D-2 of the DCD. The column illustrates whether there is impact to Total Integrated Dose or not when components are submerged in case of high-energy line break (HELB) including loss-of-coolant-accident (LOCA). Identification of no impact to Total Indicated Dose is identified by the number shown below.

(1) Components with no possibility of submergence.
(2) Components that can be submerged in case of HELB, however these components are not required to assure the safety function (including components with alternativeness).
(3) Non-safety related components.

Only the Reactor Vessel and Refueling Water Storage Pit is subjected to the Influence of Submergence for Total Integrated Dose. These components will be submerged in recirculation water during a LOCA, and thus are subjected to the contribution of dose due to radioactive material released inside C/V and also of dose due to recirculation water during the LOCA.

Answer to Item 3:
As seen in the radiological environment of the listed equipment in Table 3D-2 of the DCD, columns for the zone numbers and radiation condition will be added to Table 3D-2, and the location of the zone numbers will be provided in new Table 3D-3. Refer to the Answer to Item 4 of Question No.: 03.11-2 of this RAI for the radiation condition.
Note that the zones in Table 3D-3 have been added from Table 5-1 of the US-APWR MUAP-08015(R0) "Equipment Environmental Qualification Program" as follows.

- Zone 1 is further subdivided into six zones as shown in the following table so as to indicate the contribution of gamma rays, neutrons and beta rays.
- The scope of Zones 13 and 14 are changed as shown in the following table so as to ensure that the all listed equipments in 3D-2 will correspond to the respective zones.

Befor Revision		After Revision	
Zone	Location	Zone	Location
1	Containment	1	Containment
		1-1	Reactor Vessel
		1-2	Nuclear Instrument System
		1-3	Inside Reactor Coolant System
		1-4	Inside Secondary Shield (including Regenerative Hx Room)
		1-5	Under Operation Floor
		1-6	Above Operation Floor (including Refueling Water Storage Pit)
13	Auxiliary Building General Mechanical Area (Radiological Area)	13	Reactor Building and Auxiliary Building General Mechanical Area (Radiological Area)
		13-1	Auxiliary Building General Mechanical Area
		13-2	Reactor Building Sample Hx Room
		13-3	Reactor Building Passage
14	Turbine Building General Mechanical Area (Non-Radiological Area)		Reactor Building and Turbine Building General Mechanical Area (Non-Radiological Area)

In addition, corrections will be made in Table 3D-2, as incorrect descriptions listed in the following table are found with regard to the installation location:

Item Num	Equipment Tag	Description	Building Location	
			after revision	before revision
Instruments (Transmitters)				
35	SIS-FT-972	A - Safety Injection Pump Minimum Flow	PCCV	R/B
36	SIS-FT-973	B - Safety Injection Pump Minimum Flow	PCCV	R/B
37	SIS-FT-974	C - Safety Injection Pump Minimum Flow	PCCV	R/B
38	SIS-FT-975	D - Safety Injection Pump Minimum Flow	PCCV	R/B
147	EWS-PT-2005	A - Essential Service Water Header Pressure	UHSRS	R/B
148	EWS-PT-2006	B - Essential Service Water Header Pressure	UHSRS	R/B
149	EWS-PT-2007	C - Essential Service Water Header Pressure	UHSRS	R/B
150	EWS-PT-2008	D - Essential Service Water Header Pressure	UHSRS	R/B
Instruments (Switches)				
49	VRS-TS-2725A	A - Essential Chiller Unit Area Temperature	PS/B	R/B
50	VRS-TS-2728A	A - Essential Chiller Unit Area Temperature	PS/B	R/B
51	VRS-TS-2729A	A - Essential Chiller Unit Area Temperature	PS/B	R/B
52	VRS-TS-2725B	B - Essential Chiller Unit Area Temperature	PS/B	R/B
53	VRS-TS-2728B	B - Essential Chiller Unit Area Temperature	PS/B	R/B
54	VRS-TS-2729B	B - Essential Chiller Unit Area Temperature	PS/B	R/B
55	VRS-TS-2725C	C - Essential Chiller Unit Area Temperature	PS/B	R/B
56	VRS-TS-2728C	C - Essential Chiller Unit Area Temperature	PS/B	R/B
57	VRS-TS-2729C	C - Essential Chiller Unit Area Temperature	PS/B	R/B
58	VRS-TS-2725D	D - Essential Chiller Unit Area Temperature	PS/B	R/B
59	VRS-TS-2728D	D - Essential Chiller Unit Area Temperature	PS/B	R/B
60	VRS-TS-2729D	D - Essential Chiller Unit Area Temperature	PS/B	R/B
Cables				
6	N/A	Medium Voltage Power Cable (Harsh Specification)	R/B	PCCV, R/B
Equipment (Liquid Radioactive Waste Management System)				
21	LMS-RCV-035A	Air Operated Valve	A/B	R/B
22	LMS-RCV-035B	Air Operated Valve	A/B	R/B
Equipment (Engineered Safety Features Ventilation System)				
51	VRS-RFN-251A	A-Class 1E Battery Room Exhaust Fan	PS/B	R/B
52	VRS-RFN-251B	B-Class 1E Battery Room Exhaust Fan	PS/B	R/B
53	VRS-RFN-251C	C-Class 1E Battery Room Exhaust Fan	PS/B	R/B
54	VRS-RFN-251D	D-Class 1E Battery Room Exhaust Fan	PS/B	R/B
55	VRS-MOD-251A	Motor Operated Damper	PS/B	R/B
56	VRS-MOD-251B	Motor Operated Damper	PS/B	R/B
57	VRS-MOD-251C	Motor Operated Damper	PS/B	R/B
58	VRS-MOD-251D	Motor Operated Damper	PS/B	R/B
59	VRS-MOD-252A	Motor Operated Damper	PS/B	R/B
60	VRS-MOD-252B	Motor Operated Damper	PS/B	R/B
61	VRS-MOD-252C	Motor Operated Damper	PS/B	R/B
62	VRS-MOD-252D	Motor Operated Damper	PS/B	R/B

Answer to Item 4:
Since the current Total Integrated Dose is evaluated on the basis of the dose rates from Radiation Zone Map for normal operation and during a LOCA, neutrons and beta rays are not specifically mentioned. Therefore, old Table 5-4 "Radiation Environments after LOCA Accident" of the US-APWR MUAP-08015(R0) "Equipment Environmental Qualification Program" will be replaced to new Table 5-4 "Radiation Environment (Normal Operation)" ,indicating the dose rate for each zone to indicate the contribution of gamma rays, neutrons and beta rays (airborne). The old Table 5-4 will be changed to new Table 5-5 "Total integrated dose for zone". The new Table 5-5 indicates Total Integrated Dose (normal operation for 60 years + accident (LOCA)) for each zone for this RAI request and also corrects errors in the old Table 5-4. "Mild" or "Harsh" is also included in the Table 5-5 as a radiation condition for the Total Integrated Dose in each zone.

Table 5-4 Radiation Environment (Normal Operation)

Location			radiation (rad/h)			
			γ	n	β	total
Zone 1 Containment	1-1	Reactor Vessel	1.3E+6	1.3E+6	-[1]	2.6E+6
	1-2	Nuclear Instrument System	3.1E+3	1.5E+5	-[1]	1.5E+5
	1-3	Inside Reactor Coolant System	1.7E+3	-[1]	-[1]	1.7E+3
	1-4	Inside Secondary Shield (including Regenerative Hx Room)	5.0E+2	-[1]	-[2]	5.0E+2
	1-5	Under Operation Floor	1.0E+2	-[1]	-[1]	1.0E+2
	1-6	Above Operation Floor (including Refueling Water Storage Pit)	1.0E+0	-[1]	8.0E-2[3]	1.1E+0
Zone 2 MCR and Remote Shutdown Console Room			2.5E-4	-[1]	-[1]	2.5E-4
Zone 3 Class 1E I&C Room			2.5E-4	-[1]	-[1]	2.5E-4
Zone 4 Class 1E I&C Room, UPS Room, Battery Charger Room, and Reactor Trip Breaker Room			2.5E-4	-[1]	-[1]	2.5E-4
Zone 5 Class 1E Battery Room			2.5E-4	-[1]	-[1]	2.5E-4
Zone 6 Penetration Area and Safeguard Components Area(Radiological Area)			1.0E+2	-[1]	-[1]	1.0E+2
Zone 7 Safety Related Component Area(Radiological Area)			1.0E+2	-[1]	-[1]	1.0E+2
Zone 8 Safety Related Component Area (Non-Radiological Area)			2.5E-4	-[1]	-[1]	2.5E-4
Zone 9 Essential Chiller Unit and Pump Room			2.5E-4	-[1]	-[1]	2.5E-4
Zone 10 Main Steam/Feedwater Piping Area			2.5E-4	-[1]	-[1]	2.5E-4
Zone 11 Gas Turbine Area			2.5E-4	-[1]	-[1]	2.5E-4
Zone 12 Fuel Handling Area			1.5E-2	-[1]	4.6E-3[3]	2.0E-2
Zone 13 Reactor Building and Auxiliary Building General Mechanical Area (Radiological Area)	13-1	Auxiliary Building	5.0E+2	-[1]	-[1]	5.0E+2
	13-2	Reactor Building Sample Hx Room	1.0E+2	-[1]	-[1]	1.0E+2
	13-3	Reactor Building Passage	2.5E-1	-[1]	-[1]	2.5E-1
Zone 14 Reactor Building and Turbine Building General Mechanical Area(Non-Radiological Area)			2.5E-4	-[1]	-[1]	2.5E-4

Notes

1: This dose rate is negligible or zero when compared to the total dose rate.

2: Irradiation by beta ray will be negligible as the thermocouple sensor in RCS hot/cold leg manifold is covered with a stainless steel sheath.

3: This dose rate is beta ray from airborne.

Table 5-5 Total Integrated Dose for Zone (Sheet 1 of 7)

Zone	Operational Duration	Normal Operation Cumulative Dose (rad)				Accident Cumulative Dose (rad)			Total (rad)	Radiation Condition	
										Harsh or Mild	
		γ	n	β	Total	γ	β	Total		Electrical	Mechanical
1-1	5 min	6.9E+11	6.9E+11	-	1.4E+12	4.7E+05	2.4E+06	2.9E+06	1.4E+12	Harsh	Harsh
	2 wks [1]					8.5E+07	4.9E+08	5.8E+08	1.4E+12	Harsh	Harsh
	4 mos					2.5E+08	9.2E+08	1.2E+09	1.4E+12	Harsh	Harsh
	1 yr					5.1E+08 (8.1E+08) [2]	1.5E+09 (1.6E+09) [2]	2.0E+09 (2.4E+09) [2]	1.4E+12 (1.4E+12) [2]	Harsh	Harsh
1-2	5 min	1.7E+09	7.9E+10	-	8.1E+10	4.7E+05	2.4E+06	2.9E+06	8.1E+10	Harsh	Harsh
	2 wks [1]					8.5E+07	4.9E+08	5.8E+08	8.2E+10	Harsh	Harsh
	4 mos					2.5E+08	9.2E+08	1.2E+09	8.2E+10	Harsh	Harsh
	1 yr					5.1E+08	1.5E+09	2.0E+09	8.3E+10	Harsh	Harsh
1-3	5 min	9.0E+08	-	-	9.0E+08	4.7E+05	2.4E+06	2.9E+06	9.0E+08	Harsh	Harsh
	2 wks [1]					8.5E+07	4.9E+08	5.8E+08	1.5E+09	Harsh	Harsh
	4 mos					2.5E+08	9.2E+08	1.2E+09	2.1E+09	Harsh	Harsh
	1 yr					5.1E+08	1.5E+09	2.0E+09	2.9E+09	Harsh	Harsh

Provide table notes on last page of table

Table 5-5 Total Integrated Dose for Zone (Sheet 2 of 7)

Zone	Operational Duration	Normal Operation Cumulative Dose (rad)				Accident Cumulative Dose (rad)			Total (rad)	Radiation Condition	
										Harsh or Mild	
		γ	n	β	Total	γ	β	γ		Electrical	Mechanical
1-4	5 min	2.7E+08	-	-	2.7E+08	4.7E+05	2.4E+06	2.9E+06	2.7E+08	Harsh	Harsh
	2 wks [1]					8.5E+07	4.9E+08	5.8E+08	8.4E+08	Harsh	Harsh
	4 mos					2.5E+08	9.2E+08	1.2E+09	1.5E+09	Harsh	Harsh
	1 yr					5.1E+08	1.5E+09	2.0E+09	2.3E+09	Harsh	Harsh
1-5	5 min	5.3E+07	-	-	5.3E+07	4.7E+05	2.4E+06	2.9E+06	5.6E+07	Harsh	Harsh
	2 wks [1]					8.5E+07	4.9E+08	5.8E+08	6.3E+08	Harsh	Harsh
	4 mos					2.5E+08	9.2E+08	1.2E+09	1.3E+09	Harsh	Harsh
	1 yr					5.1E+08	1.5E+09	2.0E+09	2.1E+09	Harsh	Harsh
1-6	5 min	5.3E+05	-	4.3E+04	5.7E+05	4.7E+05	2.4E+06	2.9E+06	3.5E+06	Harsh	Harsh
	2 wks [1]					8.5E+07	4.9E+08	5.8E+08	5.8E+08	Harsh	Harsh
	4 mos					2.5E+08	9.2E+08	1.2E+09	1.2E+09	Harsh	Harsh
	1 yr					5.1E+08 (8.1E+08) [2]	1.5E+09 (1.6E+09) [2]	2.0E+09 (2.4E+09) [2]	1.4E+12 (1.4E+12) [2]	Harsh	Harsh

Table 5-5 Total Integrated Dose for Zone (Sheet 3 of 7)

Zone	Operational Duration	Normal Operation Cumulative Dose (rad)				Accident Cumulative Dose (rad)			Total (rad)	Radiation Condition	
										Harsh or Mild	
		γ	n	β	Total	γ	β	Total		Electrical	Mechanical
2	5 min	1.4E+02	-	-	1.4E+02	1.9E-01	-	1.9E-01	1.4E+02	Mild	Mild
	2 wks [1]					3.3E+01	-	3.3E+01	1.7E+02	Mild	Mild
	4 mos					4.2E+01	-	4.2E+01	1.8E+02	Mild	Mild
	1 yr					4.8E+01	-	4.8E+01	1.8E+02	Mild	Mild
3	5 min	1.4E+02	-	-	1.4E+02	1.9E-01	-	1.9E-01	1.4E+02	Mild	Mild
	2 wks [1]					3.3E+01	-	3.3E+01	1.7E+02	Mild	Mild
	4 mos					4.2E+01	-	4.2E+01	1.8E+02	Mild	Mild
	1 yr					4.8E+01	-	4.8E+01	1.8E+02	Mild	Mild
4	5 min	1.4E+02	-	-	1.4E+02	1.9E-01	-	1.9E-01	1.4E+02	Mild	Mild
	2 wks [1]					3.3E+01	-	3.3E+01	1.7E+02	Mild	Mild
	4 mos					4.2E+01	-	4.2E+01	1.8E+02	Mild	Mild
	1 yr					4.8E+01	-	4.8E+01	1.8E+02	Mild	Mild

Table 5-5 Total Integrated Dose for Zone (Sheet 4 of 7)

Zone	Operational Duration	Normal Operation Cumulative Dose (rad)				Accident Cumulative Dose (rad)			Total (rad)	Radiation Condition	
										Harsh or Mild	
		γ	n	β	Total	γ	β	Total		Electrical	Mechanical
5	5 min	1.4E+02	-	-	1.4E+02	1.9E-04	-	1.9E-04	1.4E+02	Mild	Mild
	2 wks [1]					3.8E-01	-	3.8E-01	1.4E+02	Mild	Mild
	4 mos					3.3E+00	-	3.3E+00	1.4E+02	Mild	Mild
	1 yr					9.7E+00	-	9.7E+00	1.5E+02	Mild	Mild
6	5 min	5.3E+07	-	-	5.3E+07	4.7E+05	2.4E+06	2.9E+06	5.6E+07	Harsh	Harsh
	2 wks [1]					8.5E+07	4.9E+08	5.8E+08	6.3E+08	Harsh	Harsh
	4 mos					2.5E+08	9.2E+08	1.2E+09	1.3E+09	Harsh	Harsh
	1 yr					5.1E+08	1.5E+09	2.0E+09	2.1E+09	Harsh	Harsh
7	5 min	5.3E+07	-	-	5.3E+07	9.2E+01	-	9.2E+01	5.3E+07	Harsh	Harsh
	2 wks [1]					1.9E+05	-	1.9E+05	5.3E+07	Harsh	Harsh
	4 mos					1.7E+06	-	1.7E+06	5.5E+07	Harsh	Harsh
	1 yr					4.9E+06	-	4.9E+06	5.8E+07	Harsh	Harsh

Table 5-5 Total Integrated Dose for Zone (Sheet 5 of 7)

Zone	Operational Duration	Normal Operation Cumulative Dose (rad)				Accident Cumulative Dose (rad)			Total (rad)	Radiation Condition	
										Harsh or Mild	
		γ	n	β	Total	γ	β	Total		Electrical	Mechanical
8	5 min	1.4E+02	-	-	1.4E+02	1.9E+01	-	1.9E+01	1.5E+02	Mild	Mild
	2 wks [1]					3.8E+04	-	3.8E+04	3.8E+04	Harsh	Harsh
	4 mos					3.3E+05	-	3.3E+05	3.3E+05	Harsh	Harsh
	1 yr					9.7E+05	-	9.7E+05	9.7E+05	Harsh	Harsh
9	5 min	1.4E+02	-	-	1.4E+02	1.9E-04	-	1.9E-04	1.4E+02	Mild	Mild
	2 wks [1]					3.8E-01	-	3.8E-01	1.4E+02	Mild	Mild
	4 mos					3.3E+00	-	3.3E+00	1.4E+02	Mild	Mild
	1 yr					9.7E+00	-	9.7E+00	1.5E+02	Mild	Mild
10	5 min	1.4E+02	-	-	1.4E+02	4.7E+05	2.4E+06	2.9E+06	2.9E+06	Harsh	Harsh
	2 wks [1]					8.5E+07	4.9E+08	5.8E+08	5.8E+08	Harsh	Harsh
	4 mos					2.5E+08	9.2E+08	1.2E+09	1.2E+09	Harsh	Harsh
	1 yr					5.1E+08	1.5E+09	2.0E+09	2.0E+09	Harsh	Harsh

Table 5-5 Total Integrated Dose for Zone (Sheet 6 of 7)

Zone	Operational Duration	Normal Operation Cumulative Dose (rad)				Accident Cumulative Dose (rad)			Total (rad)	Radiation Condition	
										Harsh or Mild	
		γ	n	β	Total	γ	β	Total		Electrical	Mechanical
11	5 min	1.4E+02	-	-	1.4E+02	1.9E-04	-	1.9E-04	1.4E+02	Mild	Mild
	2 wks [1]					3.8E-01	-	3.8E-01	1.4E+02	Mild	Mild
	4 mos					3.3E+00	-	3.3E+00	1.4E+02	Mild	Mild
	1 yr					9.7E+00	-	9.7E+00	1.5E+02	Mild	Mild
12	5 min	7.9E+03	-	2.5E+03	1.1E+04	1.9E-01	-	1.9E-01	1.1E+04	Harsh	Harsh
	2 wks [1]					3.3E+01	-	3.3E+01	1.1E+04	Harsh	Harsh
	4 mos					7.6E+01	-	7.6E+01	1.1E+04	Harsh	Harsh
	1 yr					1.8E+02	-	1.8E+02	1.1E+04	Harsh	Harsh
13-1	5 min	2.7E+08	-	-	2.7E+08	1.0E+04	-	1.0E+04	2.7E+08	Harsh	Harsh
	2 wks [1]					2.1E+07	-	2.1E+07	2.9E+08	Harsh	Harsh
	4 mos					1.8E+08	-	1.8E+08	4.4E+08	Harsh	Harsh
	1 yr					5.3E+08	-	5.3E+08	7.9E+08	Harsh	Harsh

Table 5-5 Total Integrated Dose for Zone (Sheet 7 of 7)

Zone	Operational Duration	Normal Operation Cumulative Dose (rad)				Accident Cumulative Dose (rad)			Total (rad)	Radiation Condition	
										Harsh or Mild	
		γ	n	β	Total	γ	β	Total		Electrical	Mechanical
13-2	5 min	5.3E+07	-	-	5.3E+07	9.2E+01	-	9.2E+01	5.3E+07	Harsh	Harsh
	2 wks [1]					1.9E+05	-	1.9E+05	5.3E+07	Harsh	Harsh
	4 mos					1.7E+06	-	1.7E+06	5.5E+07	Harsh	Harsh
	1 yr					4.9E+06	-	4.9E+06	5.8E+07	Harsh	Harsh
13-3	5 min	1.4E+05	-	-	1.4E+05	1.9E-01	-	1.9E-01	1.4E+05	Harsh	Harsh
	2 wks [1]					3.3E+01	-	3.3E+01	1.4E+05	Harsh	Harsh
	4 mos					7.6E+01	-	7.6E+01	1.4E+05	Harsh	Harsh
	1 yr					1.8E+02	-	1.8E+02	1.4E+05	Harsh	Harsh
14	5 min	1.4E+02	-	-	1.4E+02	1.9E-04	-	1.9E-04	1.4E+02	Mild	Mild
	2 wks [1]					3.8E-01	-	3.8E-01	1.4E+02	Mild	Mild
	4 mos					3.3E+00	-	3.3E+00	1.4E+02	Mild	Mild
	1 yr					9.7E+00	-	9.7E+00	1.5E+02	Mild	Mild

Notes
1. Including 30 min, 2 hr and 36 hr
2. Cumulative dose in parentheses include dose from recirculation water.

Answer to Item 5:

For any zones not inside the C/V, the annulus area, or the main steam piping area, the LOCA cumulative doses listed in Table 5-4 of Technical Report MUAP-08015, "Equipment Environmental Qualification Program" were calculated based on the dose rate for each zone (the highest dose rate of the upper limits of the areas within the same zone) shown in Figures 12.3-3 to 12.3-7 in the US-APWR DCD, Section 12.3. The dose rates in Figure 12.3-3 to 12.3-7 are set based on the dose rates (those for gamma rays) from radioactivity in the C/V at the time of the accident (LOCA). These are sorted out in Table 1, below. The specific ways cumulative doses were calculated are described below.

(1) Zones not inside the C/V, the annulus area, or the main steam piping area

(i) 5 minutes later

For the cumulative dose following a lapse of 5 minutes, the amount accumulated in 5 minutes was calculated on the assumption that the dose rate obtained by doubling the dose rate one hour after an accident is regarded as the dose rate measured immediately after the accident and this dose rate continues for one hour. An estimated margin of 10% is included. For example, in Zone 3 (Class 1E I&C Room), the upper limit dose rate after a lapse of 1 hour is 1 (rem/h) (refer to Table 1) and the dose rate measured immediately after the accident is 2 (rem/h). Consequently, the following equation is derived:

$$[2\ (\text{rem/h}) \times 5\ (\text{min}) / 60\ (\text{min})] \times 1.1 \approx 1.9\text{E-}01\ (\text{rem})$$

Here, when we assume 1 rem ≈ 1 rad, the cumulative dose becomes 1.9E-01 (rad). This approach is applied to all zones.

(ii) 2 weeks later

At first, the cumulative dose for the first day was calculated on the assumption that the dose rate is obtained by doubling the dose rate one hour after an accident, which is regarded as the dose rate measured immediately after the accident, and the dose rate measured one hour after the accident continues for the following 23 hours. The accumulation was calculated on the assumption that the dose rate measured one day after the accident continues for six days following the second day and the dose rate measured one week after the accident continues for one week following the eighth day. In this case, an estimated margin of 10% is included. In the case of Zone 3 (Class 1E I&C Room), the following equations are provided or derived:

1st day:	$2\ (\text{rem/h}) \times 1\ (\text{h}) + 1\ (\text{mrem/h}) \times 23\ (\text{h}) = 25.0\ (\text{rem})$
2nd day to 7th day:	$15\ (\text{mrem/h}) \times 24\ (\text{h}) \times 6\ (\text{d}) = 2.2\ (\text{rem})$
8th day to 14th day:	$15\ (\text{mrem/h}) \times 24\ (\text{h}) \times 7\ (\text{d}) = 2.5\ (\text{rem})$

Consequently, we derive that (25.0+2.2+2.5) (rem) × 1.1 ≈ 3.3E+01 (rem). Similarly, with 1 rem ≈ 1 rad assumed, we can derive 3.3E+01 (rad). This is the same for other zones.

(iii) 4 months later (122 days later)

First, the value found in (ii) is used for the two-week cumulative dose. The accumulation was calculated on the assumption that the dose rate measured one week after the accident continues from the 15h day to the first month and the dose rate measured one month after the accident continues for four months following the 31st day following the

accident. In this case, a margin of 10% is included in the same manner as in the above cases. In the case of Zone 3 (Class 1E I&C Room), for example, we derive the following equations:

Through the 14th day:	29.7 (rem)
15th day to 30th day:	15 (mrem/h) × 24 (h) ×16 (d) = 5.8 (rem)
31st day to 122nd day:	1 (mrem/h) × 24 (h) × 92 (d) = 2.2 (rem)

Accordingly, we derive that (29.7+5.8+2.2) (rem) × 1.1 ≈ 4.2E+01 (rem). Similarly, with 1 rem ≈ 1 rad assumed, we can derive 4.2E+01 (rad). This is the same for other zones.

(iv) 1 year later (365 days later)

First, the value found in (iii) is used for the four-moth cumulative dose. The accumulation was calculated on the assumption that the dose rate measured one week after the accident continues from the 123rd day to the first one year and the dose rate measured one month after the accident continues for four months following the 30th day following the accident. In this case, a margin of 10% is also estimated in it in the same manner as in the case of 5 minutes later. In the case of Zone 3 (Class 1E I&C Room), for example, the following equations are derived:

Through the 122nd day:	37.7 (rem)
123rd day to 365th day:	1 (mrem/h) ×24 (h) ×243 (d) = 5.8 (rem)

Thus, (37.7+5.8) (rem) × 1.1 ≈ 4.8E+01 (rem) is derived. Similarly, with 1 rem ≈ 1 rad assumed, 4.8E+01 (rad) is derived. This is the same with other zones.

(2) Inside the C/V, the annulus area, and the main steam piping area

The calculation method is different from (1) for inside the C/V, the annulus area, and the main steam piping area.

First, accumulative radioactivity in the reactor core is calculated using the ORIGEN2 code. The gamma and beta ray source intensities are calculated from the airborne radioactive concentration in the C/V when the radioactivity is released into the C/V during LOCA. Then the cumulative absorbed doses of gamma and beta rays calculated every hour were found. For inside the C/V, the annulus area, and the main steam piping area, all the results are regarded as the same. The calculation results are listed in Table 2 and the calculation methods are described below (Refer to the answer to Question 1 of this RAI).

(i) Core inventory

The core inventory used in this calculation is that based on the calculation result of the ORIGEN2 code considering 32.1 MW/MTU of specific power, 28 months as irradiation time for a cycle (these conditions are equivalent to about 55 GWD/MTU.), and 102% of the design core thermal power).

(ii) Source intensity according to the radioactive material released inside the C/V

The airborne radioactive concentration inside the C/V was assessed together with hourly depletion from the radioactive material released inside the C/V when the core inventory in (i) is released into the C/V according to the release fractions listed in Table 15.0-15 of DCD Section 15. The gamma and beta ray source intensities for each hour were calculated.

a) Airborne radioactive concentration inside the C/V

- The amount of airborne radioactivity inside the C/V was assessed based on the following assumptions:
- Because of damage to the fuel rod due to LOCA, the radioactive material accumulated in the reactor core is released into the C/V according to the release fractions listed in Table 15.0-15.
- All radioactive material released into the C/V is airborne. Decreases due to deposit and attachment are not taken into consideration.
- The removal effect of radioactive material by the C/V spray is ignored.
- Once released into the C/V, it does not melt into recirculation water.

The amount of airborne radioactivity inside the C/V assessed based on the above consumptions is divided by the free volume in the C/V to calculate the airborne radioactive concentration inside the C/V.

b) Gamma ray source intensity

The gamma ray source intensity was calculated from the airborne radioactive concentration inside the C/V using the MicroShield code.

c) Beta ray source intensity

The beta ray source intensity was calculated by multiplying the airborne radioactive concentration inside the C/V by the beta ray effective energy. The value written in Federal Guidance Report No. 12 is used for the beta ray effective energy.

(iii) Cumulative absorbed dose

a) Cumulative gamma ray dose

For the absorbed dose rate due to airborne radioactivity inside the C/V, the absorbed dose rate in the center of the C/V was found according to the MicroShield code by using the calculation model with the C/V free volume approximate to a cylinder. The cumulative dose rate was calculated from the absorbed dose rate found every hour.

b) Cumulative of beta ray dose

The absorbed beta ray dose rate was calculated using the submersion model where radioactive concentration is uniformly distributed. The calculation formula is shown below. In this case, the cumulative absorbed dose rate was also calculated from the hourly absorbed dose rate calculation result.

$$H_\beta = \frac{K \cdot E_\beta}{\rho} \cdot \chi$$

where,

H_β: Absorbed dose rate (Gy/s)

K : 1.6×10^{-10} ((Gy/s) (dis/MeV) (g/Bq))

E_β: Effective energy of beta ray (MeV/dis)

ρ: Density of air (g/cm^3)

χ : Radioactive concentration inside CV (Bq/cm^3)

By the way, as explained in the answer to Item 4 of this RAI, Table 5-4 of the Technical Report MUAP-08015(R0) will be revised with some information and become new "Table 5-5". Please refer to the answer to Item 4 of this RAI.

Table 1 Upper Limit Dose Rate for Each Zone in the Figure 12.3-3 thru 12.3-6 of DCD

Location	Upper limit dose rate			
	1 hour	1 day	1 Week	1 Month
Zone 1 Containment	—	—	—	—
Zone 2 Main Control Room and Remote Shutdown Console Room	1 rem/h	15 mrem/h	15 mrem/h	1 mrem/h
Zone 3 Class 1E I&C Room	1 rem/h	15 mrem/h	15 mrem/h	1 mrem/h
Zone 4 Class 1E Electrical Room, UPS Room, Battery Charger Room, and Reactor Trip Breaker Room	1 rem/h	15 mrem/h	15 mrem/h	1 mrem/h
Zone 5 Class 1E Battery Room	1 mrem/h	1 mrem/h	1 mrem/h	1 mrem/h
Zone 6 Penetration Area and Safeguard Component Area (Radiological Area)	—	—	—	—
Zone 7 Safety Related Component Area (Radiological Area)	500 Rad/h	500 Rad/h	500 Rad/h	500 Rad/h
Zone 8 Safety Related Component Area (Non-Radiological Area)	100 rem/h	100 rem/h	100 rem/h	100 rem/h
Zone 9 Essential Chiller Unit and Pump Room	1 mrem/h	1 mrem/h	1 mrem/h	1 mrem/h
Zone 10 Main Steam/Feedwater Piping Area	—	—	—	—
Zone 11 Gas Turbine Area	1 mrem/h	1 mrem/h	1 mrem/h	1 mrem/h
Zone 12 Fuel Handling Area	1 rem/h	15 mrem/h	15 mrem/h	15 mrem/h
Zone 13[1)] Auxiliary Building General Mechanical Area (Radiological Area)	5.45E+04 rem/h	5.45E+04 rem/h	5.45E+04 rem/h	5.45E+04 rem/h
Zone 14 Turbine Building General Mechanical Area	1 mrem/h	1 mrem/h	1 mrem/h	1 mrem/h

Note 1) The maximum area of Zone 13 is Zone X and there is no upper limit dose rate. This calculation uses the dose rate of the internal face of the wall (5.45E+03 rem/h) of the spent resin storage tank in which the dose rate is the highest.

Table 2 Results of Accident Cumulative Dose in the Containment

(rad)

	5 minutes (rad)	2 weeks (rad)	4 months (rad)	1 year (rad)
Gamma-ray	4.68E+05	8.46E+07	2.40E+08	5.01E+08
Beta-ray	2.39E+06	4.87E+08	9.18E+08	1.44E+09
Total	2.86E+06	5.71E+08	1.16E+09	1.94E+09

Impact on DCD

See Attachment 1 for a mark-up of DCD Tier 2, Appendix 3D, changes to be incorporated.

- Insert a column in Table 3D-2 titled "Influence of Submergence for Total Integrated Dose", and add "Yes" or "No (ID #)" as applicable to each item number.

- Add Notes to Table 3D-2 as follows:

  Notes:

  1. Identification number for "Influence of Submergence for Total Integrated Dose"
     (1) Components with no possibility of submergence.
     (2) Components that can be submerged in case of HELB, however these components are not required to assure the safety function (including components with alternativeness).
     (3) Non-safety related components.

- Change column title in Table 3D-2 from "Location (PCCV, R/B, A/B, O/B, T/B, UHSRS)" to "Location"

- Create two sub-columns in Table 3D-2, titled "Building" and "Zone", under column titled "Location", and add equipment item location by zone in "Zone" sub-column (equipment location by building is maintained under sub-column titled "Building")

- Correct certain equipment location by building, as noted in Answer to Item 3 above.

- Insert a column in Table 3D-2 titled "Radiation Condition", and add "Harsh" or "Mild" as applicable to each item number.

- Insert Table 3D-3 titled "Table 3D-3 Location for Zone" after Table 3D-2, and provide a list of zone numbers and locations in left and right columns, respectively.

- Add subheading "***Building***" as the first subheading under ***Location*** in the **Brief Description of Section Headings** on page 3.D-3.

- Insert the following subheading and statement on page 3.D-4, as the second subheading under ***Location*** in the **Brief Description of Section Headings**:

  "***Zone***

  Place where the referenced item/device/component is located in the Zone as shown in Table 3D-3."

- Add words "except radiation" at the last of the statement of ***Environmental Conditions***.

- Insert the following heading and statement in the **Brief Description of Section Headings**, behind ***Environmental Conditions*** and before ***Qualification Process*** on page 3.D-4,

  "***Radiation Condition***

  This illustrates the radiation condition that will be seen by the equipment that may be exposed to the radiation environment.

  Influence of Submergence for Total Integrated Dose

  This section illustrates whether there is impact to Total Integrated Dose or not when components are submerged in case of high-energy line break (HELB) including loss-of-coolant-accident (LOCA) except for those annotated with a number shown below.

(1) Components with no possibility of submergence.

(2) Components that can be submerged in case of HELB, however these components are not required to assure the safety function (including components with alternativeness).

(3) Non-safety related components."

Impact on COLA

There is no impact on the COLA.

Impact on PRA

There is no impact on the PRA.

RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION

7/10/2009

US-APWR Design Certification

Mitsubishi Heavy Industries

Docket No. 52-021

RAI NO.:	NO. 358-2462 REVISION 1
SRP SECTION:	03.11 – Environmental Qualification of Mechanical and Electrical Equipment
APPLICATION SECTION:	3.11
DATE OF RAI ISSUE:	5/13/2009

QUESTION NO.: 03.11-3

Sections 10 CFR 50.49 and 10 CFR 52.79 require licensees to develop an Environmental Qualification program for equipment important to safety. SRP Section 3.11 notes that the applicant is to provide the conceptual approach, including the environmental design bases for identified equipment. SRP Section 3.11 and Regulatory Guide 1.206 note that applicant should identify equipment located in harsh environments. They further note that the radiation environment must be based on the integrated effects of the normally expected radiation environment over the equipment's installed life, plus the effects associated with the most severe design basis event (DBE) during or following which the equipment is required to remain functional.

The following questions relate to the data presented in US-APWR Tier 2, Chapter 3, Appendix 3D, Table 3D-2 "US-APWR Environmental Qualification Equipment List" used to support the radiological Total Integrated Dose (TID) assessment for determining whether the equipment is located in a harsh or mild radiological environment.

1. Regulatory Guide 1.206 CI.3.11.1 indicates that for equipment inside containment, the applicant should specify whether the equipment is inside or outside the missile shield. Due to the large operational dose rate differences between the inside and outside shield wall locations the TID of the equipment could have significant variation. Indicate in Table 3D-2 which equipment is located inside the missile shield.

2. Regulatory Guide 1.183 Appendix I, "Assumptions for Evaluating Radiation Doses for Equipment Qualifications" notes that the radiation environment resulting from normal operations should be based on the conservative source term estimates reported in the facility's Safety Analysis Report or should be consistent with the primary coolant specific activity limits contained in the facility's technical specifications. The US-APWR report, MUAP-08015(R0) "Equipment Environmental Qualification Program" Section 5.1.2 notes that the TID from the normally expected radiation environment derives from the radiation zones depicted in FSAR Chapter 12. US-APWR FSAR Tier 2, Chapter 3, Appendix 3D, Table 3D-2 "US-APWR Environmental Qualification Equipment List" identifies a number of pieces of equipment as located in a mild environment. However, based on the Normal Operation zone maps presented in FSAR Tier 2 Section 12.3, some of these classifications may be non-conservative for operation with coolant activity values associated with Design Basis Cladding defects. Examples include:

a. VRS-TS-2330 Penetration Area Temperature, which Figure 12.3-1 lists as a 10 rem/h area.
b. VRS-TS-2733 Charging Pump Area Temperature, which Figure 12.3-1 lists as a 10 rem/h area.
c. CVS-RPP-001A, A-Charging Pump, which Figure 12.3-1 lists as a 10 rem/h area.

Revise Table 3D-2 to provide the location and dose rate information that supports the stated environmental environment type noted in Table 3D-2.

3. US-APWR FSAR Tier 2, Section 3.11.5.2 notes that radiation dose rates and integrated doses of neutrons, beta, and gamma radiation harsh environmental conditions for various plant areas and systems, are presented in Appendix 3D and that the parameters are presented in time-based units, wherever applicable. Provide in Appendix 3D, the beta, gamma and neutron dose rates, the time bases and the TID for neutron and beta radiation.

4. SRP Section 3.11 and Regulatory Guide 1.206 note that applicant should identify the radiation environment is based on the Total Integrated Dose (TID) effects of the normally expected radiation environment over the equipment's installed life, plus the effects associated with the most severe design basis event (DBE) during or following which the equipment is required to remain functional. Indicate in US-APWR FSAR Tier 2 Table 3D-2 "Environmental Qualification Equipment List" which pieces of equipment will be in a harsh environment (i.e. TID exceeding 1E+3 rads for electronic equipment or 1E+4 rads for mechanical equipment) solely as a result of radiation exposure.

In accordance with NUREG-0800, RG-1.206 and RG 1.183, revise US-APWR FSAR Tier 2 to provide the information requested, or provide the specific alternative approaches used and the associated justification.

ANSWER:

Answer to Item 1:
The misile shield of the US-APWR is a steel plate which is attached to the upper part of the integrated head package. It is not at the boundary between the inside and outside of the missile shield that the equipment Total Integrated Dose varies significantly, but at the boundary between the inside and outside of the secondary shield. As mentioned in our Answer to Item 3 of QUESTION NO.: 03.11-2 of this RAI, Table 3D-2 of the DCD has an added column of Zone representing the location, while the zone indicating the inside of the secondary shield is as shown below:

Zone1-1 Reactor Vessel
Zone1-2 Nuclear Instrument System
Zone1-3 Inside Reactor Coolant System
Zone1-4 Inside Secondary Shield (including Regenerative Hx Room)

Answer to Item 2:
The response to this question is included in Answers to Item 3 and 4 of QUESTION NO.: 03.11-2 of this RAI.

Answer to Item 3:
The response to this question is included in Answers to Item 3 and 4 of QUESTION NO.: 03.11-2 of this RAI.

Answer to Item 4:
The response to this question is included in Answers to Item 3 and 4 of QUESTION NO.: 03.11-2 of this RAI.

Impact on DCD

There is no impact on the DCD.

Impact on COLA

There is no impact on the COLA.

Impact on PRA

There is no impact on the PRA.

RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION

7/10/2009

US-APWR Design Certification

Mitsubishi Heavy Industries

Docket No. 52-021

RAI NO.:	**NO. 358-2462 REVISION 1**
SRP SECTION:	**03.11 – Environmental Qualification of Mechanical and Electrical Equipment**
APPLICATION SECTION:	**3.11**
DATE OF RAI ISSUE:	**5/13/2009**

QUESTION NO.: 03.11-4

Sections 10 CFR 50.49 and 10 CFR 52.79 require licensees to develop an Environmental Qualification program for equipment important to safety. SRP Section 3.11 notes that the applicant is to provide the conceptual approach, including the environmental design bases for identified equipment. SRP Section 3.11 and Regulatory Guide 1.206 note that applicant should identify equipment located in harsh environments. They further note that the radiation environment must be based on the integrated effects of the normally expected radiation environment over the equipment's installed life, plus the effects associated with the most severe design basis event (DBE) during or following which the equipment is required to remain functional.

SRP Section 3.11 notes that the applicant is to provide the ITAAC to ensure that all SCCs required, are identified. The US-APWR FSAR Tier 2 Table 3D-2 indicates that the area in the Reactor Building containing the Main Steam Safety Valves, and the Main Steam Depressurization Valves is identified as a harsh environment. However, US-APWR Tier 1 Table 2.7.6.6-1 "Process Effluent Radiation Monitoring and Sampling System Equipment Characteristics" notes that the N-16 and Main Steam Line RMS monitors are not located in a harsh environment.

Revise US-APWR FSAR Tier 2 Section 3.11 Table 3D-2 or US-APWR Tier 1 Table 2.7.6.6-1 to clarify the environmental conditions in the location of these radiation monitors, or provide the specific alternative approaches used and the associated justification.

ANSWER:

The word "Yes" is indicated in the column of "Harsh" in Table 2.7.6.6-1 "Process Effluent Radiation Monitoring and Sampling System Equipment Characteristics" in US-AWPR Tier1 when the equipment shall be required the following condition;

- Equipment is Class 1E.
- Equipment is located in the post accident harsh environmental condition.
- Equipment is operational on the post accident harsh environmental condition.

N-16 and Main Steam Line RMS monitors are located in a harsh environment. However both

monitors are not classified as Class 1E equipment and are not required their operation on the post accident harsh environmental condition. Thus the N-16 and Main Steam Line RMS monitors are not addressed in the Table 3D-2.

Impact on DCD

There is no impact on the DCD.

Impact on COLA

There is no impact on the COLA.

Impact on PRA

There is no impact on the PRA.

RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION

7/10/2009

US-APWR Design Certification

Mitsubishi Heavy Industries

Docket No. 52-021

RAI NO.:	NO. 358-2462 REVISION 1
SRP SECTION:	03.11 – Environmental Qualification of Mechanical and Electrical Equipment
APPLICATION SECTION:	3.11
DATE OF RAI ISSUE:	5/13/2009

QUESTION NO.: 03.11-5

Sections 10 CFR 50.49 and 10 CFR 52.79 require licensees to develop an Environmental Qualification program for equipment important to safety. SRP Section 3.11 notes that the applicant is to provide the conceptual approach, including the environmental design bases for identified equipment. SRP Section 3.11 and Regulatory Guide 1.206 note that applicant should identify equipment located in harsh environments. They further note that the radiation environment must be based on the integrated effects of the normally expected radiation environment over the equipment's installed life, plus the effects associated with the most severe design basis event (DBE) during or following which the equipment is required to remain functional.

SRP Section 3.11 and Regulatory Guide 1.206 note that applicant should identify required operating time for equipment. The US-APWR FSAR Tier 2, Chapter 3, Appendix 3D, Table 3D-1 "Equipment Post-Accident Operability Times" has the following information that requires clarification or explanation:

1) Some equipment located inside containment has a 4-month operability requirement based on the acceptable time to replace, recalibrate or obtain equivalent indication. It is not clear how this equipment would be accessed to perform these repairs or calibrations.
2) This table fails to note any limitations, due to dose rate, for equipment located outside containment, even though the post-accident dose rate maps provided in FSAR Tier 2 Section 12.3-6, indicate that very high dose rates will be present for an extended period in a number of areas containing equipment.

In accordance with NUREG-0800, RG-1.206 and RG 1.183, revise US-APWR FSAR Tier 2, Chapter 3, Appendix 3D, Table 3D-1 to provide information consistent with the expected radiological conditions as stated in the FSAR Chapter 12, or provide the specific alternative approaches used and the associated justification.

ANSWER:

In the Table 3D-1, equipment located inside containment that is inaccessible and is required for post-accident monitoring has a 4-month operability requirement based on the acceptable time to replace, recalibrate or obtain equivalent indication.

As answered for Question RAI 07.05-9 of RAI No. 238-2030 (UAP-HF-09196), the operability requirement for post accident monitoring (PAMs) equipment is as follows.

****

The operating time for each variable required for DBA conditions is addressed in the development of the qualification program, per Section 3.11 and Technical Report MUAP-08015. The design basis accident analyses provide the basis for the required durations.

a) The duration for Type A variables is determined from required operator action by the accident analysis and emergency procedure which duration is less than 4 months. All Type A variables are also other type. Therefore, the duration for Type A variables is required to be 4 months consistent with the duration for other type.
b) The duration for Type B variables is at least the duration associated with the longest-duration design basis event for that variable; 4 months is required by the accident analyses and emergency procedure of the US-APWR.
c) The duration for Type C variables is at least 100 days for instrument channels monitoring the fission product barriers; 4 months is required by the accident analyses and emergency procedure of US-APWR.
d) The duration for Type D and E is 4 months as required by the accident analyses and emergency procedure.

A shorter duration may be acceptable if equipment replacement or repair can be accomplished within an acceptable out-of-service time, taking into consideration the location and accessibility of the equipment. When PAM instrumentation is located inside containment, is inaccessible, or cannot be repaired, replaced, recalibrated or equivalent indication cannot be obtained, the required duration is 1 year.
****

When PAM instrumentation is located inside the CV or inaccessible area and the PAM function is required over 4 months, the required operability time may be increased to 1 year. Additionally, when the PAM operability is 4 months and the PAM function is required over 4 months, the PAM function is required to have an equivalent indication with required operability for 1 year.

However, 4 months duration is enough for all PAM instruments for the US-APWR, there are no PAM instruments required 1 yr duration.

Thus, repairing, replacement, and recalibration are not required for the PAM equipment located inside the CV or inaccessible area with operability of 4 months, with access inside the CV required after 4 months (post accident).

Currently, all operability is 1 year for PAMs located inside the CV as listed in Table 3D-2. This will be corrected in the DCD revision. The operability of PAMs located inside CV or inaccessible area after the accident including radiation harsh area is revised to 4 months as appropriate within the Table 3D-2.

When the access to the CV is required after post accident condition, the area or environment radiations are measured in advance and the appropriate radiation protection procedures are followed to allow access to the CV and perform the replacement, recalibration, or establishment of equivalent indication.

Impact on DCD

The operability of PAMs located inside CV or inaccessible area after the accident including radiation harsh area in the Table 3D-2 is revised to 4 months as described in Attachment 1.

Also, for more clear description, the operational duration for instruments in Table 3D-2 will be revised to each purpose based duration (e.g., 5min duration for reactor trip and 4mos duration for PAM for SG water level, safe shutdown monitoring function which duration is 36hr does not require the operability on post accident harsh environmental condition). This revision will be incorporated in the DCD mark-up as Tracking Report by this September.

Impact on COLA

There is no impact on the COLA.

Impact on PRA

There is no impact on the PRA.

Table 3D-1 Equipment Post-Accident Operability Times

Equipment	Required Post-Accident Operability	
Equipment necessary to perform trip functions	5 minutes	(Envelopes 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)

Brief Description of Section Headings

Item Number

Numerical sequence item numbering of the US-APWR Environmental Qualified Equipment.

Equipment Tag

Electrical equipment numbering system that uniquely identifies the item/device/component per acronyms/ abbreviations with sequential serial numbering system.

Description 1

Item/device/component brief description justifying the abbreviation/acronyms of the equipment tag references.

Location

Building

Place where the referenced item/device/component is located in the building.

Zone

Place where the referenced item/device/component is located in the Zone as shown in Table 3D-3.

Purpose

This section shows the objective of the equipment that is being qualified.

Operational Duration

Duration of functional time period required by the equipment to fulfill is intended safety function. (This section allows for time units to be recorded in hours, minutes, days, and years.)

Environmental Conditions

This section illustrates the environmental condition that will be seen by the equipment that may be exposed to the plant operational environment except radiation.

Radiation Condition

This illustrates the radiation condition that will be seen by the equipment that may be exposed to the radiation environment.

Influence of Submergence for Total Integrated Dose

This section illustrates whether there is impact to Total Integrated Dose or not when components are submerged in case of high-energy line break (HELB) including loss of coolant accident (LOCA) except for those annotated with a number shown below.

(1) Components with no possibility of submergence.

(2) Components that can be submerged in case of HELB, however these components are not required to assure the safety function (including components with alternativeness).

(3) Non-safety related components.

Qualification Process

This section designates the equipment classification according to the discipline that the equipment belongs to, according to the qualification program for the US-APWR.

Seismic Category

This demonstrates structural integrity and operability of mechanical and electrical equipment in the event of an earthquake or any multiplications of elastic waves throughout the earth however they are caused, which the component is expected to withstand and operate at a fully functional level.

Table 3D-2 US-APWR Environmental Qualification Equipment List
(Sheet 1 of 64)

Item Num	Equipment Tag	Description	Location (~~PCCV, R/B, A/B, O/B,T/B, UHSRS~~)		Purpose	Operational Duration	Environmental Conditions	Radiation Condition	Influence of Submergence for Total Integrated Dose	Qualification Process	Seismic Category	Comments
			Building	Zone	RT, ESF, PAM, Paressure Boundary (PB), Other		Harsh or Mild	Harsh or Mild	Yes/No	E=Electrical M=Mechanical	I, II, Non	
Instruments (Transmitters)												
1	RCS-FT-412	Loop A - Reactor Coolant Flow	PCCV	1-5	RT	5min*	Harsh	Harsh	No (1)	E	I	*Not Required Post Accident
2	RCS-FT-413	Loop A - Reactor Coolant Flow	PCCV	1-5	RT	5min*	Harsh	Harsh	No (1)	E	I	*Not Required Post Accident
3	RCS-FT-414	Loop A - Reactor Coolant Flow	PCCV	1-5	RT	5min*	Harsh	Harsh	No (1)	E	I	*Not Required Post Accident
4	RCS-FT-415	Loop A - Reactor Coolant Flow	PCCV	1-5	RT	5min*	Harsh	Harsh	No (1)	E	I	*Not Required Post Accident
5	RCS-FT-422	Loop B - Reactor Coolant Flow	PCCV	1-5	RT	5min*	Harsh	Harsh	No (1)	E	I	*Not Required Post Accident
6	RCS-FT-423	Loop B - Reactor Coolant Flow	PCCV	1-5	RT	5min*	Harsh	Harsh	No (1)	E	I	*Not Required Post Accident
7	RCS-FT-424	Loop B - Reactor Coolant Flow	PCCV	1-5	RT	5min*	Harsh	Harsh	No (1)	E	I	*Not Required Post Accident
8	RCS-FT-425	Loop B - Reactor Coolant Flow	PCCV	1-5	RT	5min*	Harsh	Harsh	No (1)	E	I	*Not Required Post Accident
9	RCS-FT-432	Loop C - Reactor Coolant Flow	PCCV	1-5	RT	5min*	Harsh	Harsh	No (1)	E	I	*Not Required Post Accident
10	RCS-FT-433	Loop C - Reactor Coolant Flow	PCCV	1-5	RT	5min*	Harsh	Harsh	No (1)	E	I	*Not Required Post Accident
11	RCS-FT-434	Loop C - Reactor Coolant Flow	PCCV	1-5	RT	5min*	Harsh	Harsh	No (1)	E	I	*Not Required Post Accident
12	RCS-FT-435	Loop C - Reactor Coolant Flow	PCCV	1-5	RT	5min*	Harsh	Harsh	No (1)	E	I	*Not Required Post Accident
13	RCS-FT-442	Loop D - Reactor Coolant Flow	PCCV	1-5	RT	5min*	Harsh	Harsh	No (1)	E	I	*Not Required Post Accident
14	RCS-FT-443	Loop D - Reactor Coolant Flow	PCCV	1-5	RT	5min*	Harsh	Harsh	No (1)	E	I	*Not Required Post Accident
15	RCS-FT-444	Loop D - Reactor Coolant Flow	PCCV	1-5	RT	5min*	Harsh	Harsh	No (1)	E	I	*Not Required Post Accident
16	RCS-FT-445	Loop D - Reactor Coolant Flow	PCCV	1-5	RT	5min*	Harsh	Harsh	No (1)	E	I	*Not Required Post Accident
17	RCS-LT-451	Pressurizer Water Level	PCCV	1-5	RT,PAM, Other	~~1yr~~ 4mos	Harsh	Harsh	No (1)	E	I	
18	RCS-LT-452	Pressurizer Water Level	PCCV	1-5	RT,PAM, Other	~~1yr~~ 4mos	Harsh	Harsh	No (1)	E	I	
19	RCS-LT-453	Pressurizer Water Level	PCCV	1-5	RT,PAM, Other	~~1yr~~ 4mos	Harsh	Harsh	No (1)	E	I	
20	RCS-LT-454	Pressurizer Water Level	PCCV	1-5	RT,PAM, Other	~~1yr~~ 4mos	Harsh	Harsh	No (1)	E	I	

Attachment 1
to RAI 358-2462

Table 3D-2 US-APWR Environmental Qualification Equipment List
(Sheet 2 of 64)

Item Num	Equipment Tag	Description	Location (~~PCCV, R/B, A/B, O/B,T/B, UHSRS~~)		Purpose	Operational Duration	Environmental Conditions	Radiation Condition	Influence of Submergence for Total Integrated Dose	Qualification Process	Seismic Category	Comments
			Building	Zone	RT, ESF, PAM, Paressure Boundary (PB), Other		Harsh or Mild	Harsh or Mild	Yes/No	E=Electrical M=Mechanical	I, II, Non	
21	RCS-PT-410	Loop A - Reactor Coolant Pressure	PCCV	1-5	PAM, Other	~~1yr~~ 4mos	Harsh	Harsh	No (1)	E	I	
22	RCS-PT-420	Loop B - Reactor Coolant Pressure	PCCV	1-5	PAM, Other	~~1yr~~ 4mos	Harsh	Harsh	No (1)	E	I	
23	RCS-PT-430	Loop C - Reactor Coolant Pressure	PCCV	1-5	PAM, Other	~~1yr~~ 4mos	Harsh	Harsh	No (1)	E	I	
24	RCS-PT-440	Loop D - Reactor Coolant Pressure	PCCV	1-5	PAM, Other	~~1yr~~ 4mos	Harsh	Harsh	No (1)	E	I	
25	RCS-PT-451	Pressurizer Pressure	PCCV	1-6	RT, ESF Other	36hr	Harsh	Harsh	No (1)	E	I	
26	RCS-PT-452	Pressurizer Pressure	PCCV	1-6	RT, ESF Other	36hr	Harsh	Harsh	No (1)	E	I	
27	RCS-PT-453	Pressurizer Pressure	PCCV	1-6	RT, ESF Other	36hr	Harsh	Harsh	No (1)	E	I	
28	RCS-PT-454	Pressurizer Pressure	PCCV	1-6	RT, ESF Other	36hr	Harsh	Harsh	No (1)	E	I	
29	CVS-FT-218	Primary Makeup Water Supply Flow	R/B	13-3	Other	2wks	Mild	Harsh	No (1)	E	I	
30	CVS-FT-219	Primary Makeup Water Supply Flow	R/B	13-3	Other	2wks	Mild	Harsh	No (1)	E	I	
31	SIS-FT-962	A - Safety Injection Pump Discharge Flow	R/B	13-3	PAM, Other	2wks	Mild	Harsh	No (1)	E	I	
32	SIS-FT-963	B - Safety Injection Pump Discharge Flow	R/B	13-3	PAM, Other	2wks	Mild	Harsh	No (1)	E	I	
33	SIS-FT-964	C - Safety Injection Pump Discharge Flow	R/B	13-3	PAM, Other	2wks	Mild	Harsh	No (1)	E	I	
34	SIS-FT-965	D - Safety Injection Pump Discharge Flow	R/B	13-3	PAM, Other	2wks	Mild	Harsh	No (1)	E	I	
35	SIS-FT-972	A - Safety Injection Pump Minimum Flow	~~R/B~~ PCCV	1-5	PAM, Other	~~2wks~~4mos	~~Mild~~ Harsh	Harsh	No (1)	E	I	
36	SIS-FT-973	B - Safety Injection Pump Minimum Flow	~~R/B~~ PCCV	1-5	PAM, Other	~~2wks~~4mos	~~Mild~~ Harsh	Harsh	No (1)	E	I	
37	SIS-FT-974	C - Safety Injection Pump Minimum Flow	~~R/B~~ PCCV	1-5	PAM, Other	~~2wks~~4mos	~~Mild~~ Harsh	Harsh	No (1)	E	I	
38	SIS-FT-975	D - Safety Injection Pump Minimum Flow	~~R/B~~ PCCV	1-5	PAM, Other	~~2wks~~4mos	~~Mild~~ Harsh	Harsh	No (1)	E	I	
39	SIS-LT-910	A - Accumulator Water Level	PCCV	1-5	PAM	~~1yr~~ 4mos	Harsh	Harsh	No (1)	E	I	
40	SIS-LT-920	B - Accumulator Water Level	PCCV	1-5	PAM	~~1yr~~ 4mos	Harsh	Harsh	No (1)	E	I	
41	SIS-LT-930	C - Accumulator Water Level	PCCV	1-5	PAM	~~1yr~~ 4mos	Harsh	Harsh	No (1)	E	I	

Attachment 1
to RAI 358-2462

Table 3D-2 US-APWR Environmental Qualification Equipment List
(Sheet 3 of 64)

Item Num	Equipment Tag	Description	Location ~~(PCCV, R/B, A/B, O/B,T/B, UHSRS)~~		Purpose	Operational Duration	Environmental Conditions	Radiation Condition	Influence of Submergence for Total Integrated Dose	Qualification Process	Seismic Category	Comments
			Building	Zone	RT, ESF, PAM, Paressure Boundary (PB), Other		Harsh or Mild	Harsh or Mild	Yes/No	E=Electrical M=Mechanical	I, II, Non	
42	SIS-LT-940	D - Accumulator Water Level	PCCV	1-5	PAM	~~1yr~~ 4mos	Harsh	Harsh	No (1)	E	I	
43	SIS-PT-910	A - Accumulator Pressure	PCCV	1-5	PAM, Other	~~1yr~~ 4mos	Harsh	Harsh	No (1)	E	I	
44	(Deleted)											
45	SIS-PT-920	B - Accumulator Pressure	PCCV	1-5	PAM, Other	~~1yr~~ 4mos	Harsh	Harsh	No (1)	E	I	
46	(Deleted)											
47	SIS-PT-930	C - Accumulator Pressure	PCCV	1-5	PAM, Other	~~1yr~~ 4mos	Harsh	Harsh	No (1)	E	I	
48	(Deleted)											
49	SIS-PT-940	D - Accumulator Pressure	PCCV	1-5	PAM, Other	~~1yr~~ 4mos	Harsh	Harsh	No (1)	E	I	
50	(Deleted)											
51	SIS-PT-960	A - Safety Injection Pump Suction Pressure	R/B	13-3	Other	36hr	Mild	Harsh	No (1)	E	I	
52	SIS-PT-961	B - Safety Injection Pump Suction Pressure	R/B	13-3	Other	36hr	Mild	Harsh	No (1)	E	I	
53	SIS-PT-962	C - Safety Injection Pump Suction Pressure	R/B	13-3	Other	36hr	Mild	Harsh	No (1)	E	I	
54	SIS-PT-963	D - Safety Injection Pump Suction Pressure	R/B	13-3	Other	36hr	Mild	Harsh	No (1)	E	I	
55	SIS-PT-964	A - Safety Injection Pump Discharge Pressure	R/B	13-3	Other	36hr	Mild	Harsh	No (1)	E	I	
56	SIS-PT-965	B - Safety Injection Pump Discharge Pressure	R/B	13-3	Other	36hr	Mild	Harsh	No (1)	E	I	
57	SIS-PT-966	C - Safety Injection Pump Discharge Pressure	R/B	13-3	Other	36hr	Mild	Harsh	No (1)	E	I	
58	SIS-PT-967	D - Safety Injection Pump Discharge Pressure	R/B	13-3	Other	36hr	Mild	Harsh	No (1)	E	I	
59	RHS-FT-601	A - Containment Spray / Residual Heat Removal Pump Discharge Flow	R/B	13-3	PAM, Other	2wks	Mild	Harsh	No (1)	E	I	
60	RHS-FT-604	A - Containment Spray / Residual Heat Removal Pump Minimum Flow	R/B	13-3	PAM, Other	2wks	Mild	Harsh	No (1)	E	I	

Attachment 1
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Table 3D-2 US-APWR Environmental Qualification Equipment List
(Sheet 4 of 64)

Item Num	Equipment Tag	Description	Location (~~PCCV, R/B, A/B, O/B,T/B, UHSRS~~)		Purpose	Operational Duration	Environmental Conditions	Radiation Condition	Influence of Submergence for Total Integrated Dose	Qualification Process	Seismic Category	Comments
			Building	Zone	RT, ESF, PAM, Paressure Boundary (PB), Other		Harsh or Mild	Harsh or Mild	Yes/No	E=Electrical M=Mechanical	I, II, Non	
61	RHS-FT-611	B – Containment Spray / Residual Heat Removal Pump Discharge Flow	R/B	13-3	PAM, Other	2wks	Mild	Harsh	No (1)	E	I	
62	RHS-FT-614	B – Containment Spray / Residual Heat Removal Pump Minimum Flow	R/B	13-3	PAM, Other	2wks	Mild	Harsh	No (1)	E	I	
63	RHS-FT-621	C – Containment Spray / Residual Heat Removal Pump Discharge Flow	R/B	13-3	PAM, Other	2wks	Mild	Harsh	No (1)	E	I	
64	RHS-FT-624	C – Containment Spray / Residual Heat Removal Pump Minimum Flow	R/B	13-3	PAM, Other	2wks	Mild	Harsh	No (1)	E	I	
65	RHS-FT-631	D – Containment Spray / Residual Heat Removal Pump Discharge Flow	R/B	13-3	PAM, Other	2wks	Mild	Harsh	No (1)	E	I	
66	RHS-FT-634	D – Containment Spray / Residual Heat Removal Pump Minimum Flow	R/B	13-3	PAM, Other	2wks	Mild	Harsh	No (1)	E	I	
67	RHS-PT-600	A – Containment Spray / Residual Heat Removal Pump Suction Pressure	R/B	13-3	Other	36hr	Mild	Harsh	No (1)	E	I	
68	RHS-PT-601	A – Containment Spray / Residual Heat Removal Pump Discharge Pressure	R/B	13-3	Other	36hr	Mild	Harsh	No (1)	E	I	
69	RHS-PT-610	B – Containment Spray / Residual Heat Removal Pump Suction Pressure	R/B	13-3	Other	36hr	Mild	Harsh	No (1)	E	I	
70	RHS-PT-611	B – Containment Spray / Residual Heat Removal Pump Discharge Pressure	R/B	13-3	Other	36hr	Mild	Harsh	No (1)	E	I	
71	RHS-PT-620	C – Containment Spray / Residual Heat Removal Pump Suction Pressure	R/B	13-3	Other	36hr	Mild	Harsh	No (1)	E	I	
72	RHS-PT-621	C – Containment Spray / Residual Heat Removal Pump Discharge Pressure	R/B	13-3	Other	36hr	Mild	Harsh	No (1)	E	I	

Attachment 1
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Table 3D-2 US-APWR Environmental Qualification Equipment List
(Sheet 5 of 64)

Item Num	Equipment Tag	Description	Location (~~PCCV, R/B, A/B, O/B,T/B, UHSRS~~)		Purpose	Operational Duration	Environmental Conditions	Radiation Condition	Influence of Submergence for Total Integrated Dose	Qualification Process	Seismic Category	Comments
			Building	Zone	RT, ESF, PAM, Paressure Boundary (PB), Other		Harsh or Mild	Harsh or Mild	Yes/No	E=Electrical M=Mechanical	I, II, Non	
73	RHS-PT-630	D - Containment Spray / Residual Heat Removal Pump Suction Pressure	R/B	13-3	Other	36hr	Mild	Harsh	No (1)	E	I	
74	RHS-PT-631	D - Containment Spray / Residual Heat Removal Pump Discharge Pressure	R/B	13-3	Other	36hr	Mild	Harsh	No (1)	E	I	
75	EFS-FT-3716	A - Emergency Feedwater Flow	R/B	8	PAM, Other	~~2wks~~4mos	Mild	Harsh	No (1)	E	I	
76	EFS-FT-3726	B - Emergency Feedwater Flow	R/B	8	PAM, Other	~~2wks~~4mos	Mild	Harsh	No (1)	E	I	
77	EFS-FT-3736	C - Emergency Feedwater Flow	R/B	8	PAM, Other	~~2wks~~4mos	Mild	Harsh	No (1)	E	I	
78	EFS-FT-3746	D - Emergency Feedwater Flow	R/B	8	PAM, Other	~~2wks~~4mos	Mild	Harsh	No (1)	E	I	
79	EFS-LT-3760	A - Emergency Feedwater Pit Water Level	R/B	14	PAM, Other	2wks	Mild	Mild	No (1)	E	I	
80	EFS-LT-3761	A - Emergency Feedwater Pit Water Level	R/B	14	PAM, Other	2wks	Mild	Mild	No (1)	E	I	
81	EFS-LT-3770	B - Emergency Feedwater Pit Water Level	R/B	14	PAM, Other	2wks	Mild	Mild	No (1)	E	I	
82	EFS-LT-3771	B - Emergency Feedwater Pit Water Level	R/B	14	PAM, Other	2wks	Mild	Mild	No (1)	E	I	
83	EFS-PT-3752	A - Emergency Feedwater Pump Discharge Pressure	R/B	8	Other	36hr	Mild	Harsh	No (1)	E	I	
84	EFS-PT-3750	B - Emergency Feedwater Pump Discharge Pressure	R/B	8	Other	36hr	Mild	Harsh	No (1)	E	I	
85	EFS-PT-3751	C - Emergency Feedwater Pump Discharge Pressure	R/B	8	Other	36hr	Mild	Harsh	No (1)	E	I	
86	EFS-PT-3753	D - Emergency Feedwater Pump Discharge Pressure	R/B	8	Other	36hr	Mild	Harsh	No (1)	E	I	
87	NFS-LT-460	A - Steam Generator Water Level (Narrow Range)	PCCV	1-6	RT,ESF, PAM	~~1yr~~ 4mos	Harsh	Harsh	No (1)	E	I	
88	NFS-LT-461	A - Steam Generator Water Level (Narrow Range)	PCCV	1-6	RT,ESF, PAM	~~1yr~~ 4mos	Harsh	Harsh	No (1)	E	I	
89	NFS-LT-462	A - Steam Generator Water Level (Narrow Range)	PCCV	1-6	RT,ESF, PAM	~~1yr~~ 4mos	Harsh	Harsh	No (1)	E	I	
90	NFS-LT-463	A - Steam Generator Water Level (Narrow Range)	PCCV	1-6	RT,ESF, PAM	~~1yr~~ 4mos	Harsh	Harsh	No (1)	E	I	
91	NFS-LT-464	A - Steam Generator Water Level (Wide Range)	PCCV	1-6	PAM, Other	~~1yr~~ 4mos	Harsh	Harsh	No (1)	E	I	

Table 3D-2 US-APWR Environmental Qualification Equipment List
(Sheet 6 of 64)

Item Num	Equipment Tag	Description	Location (~~PCCV, R/B, A/B, O/B,T/B, UHSRS~~)		Purpose	Operational Duration	Environmental Conditions	Radiation Condition	Influence of Submergence for Total Integrated Dose	Qualification Process	Seismic Category	Comments
			Building	Zone	RT, ESF, PAM, Paressure Boundary (PB), Other		Harsh or Mild	Harsh or Mild	Yes/No	E=Electrical M=Mechanical	I, II, Non	
92	NFS-LT-470	B – Steam Generator Water Level (Narrow Range)	PCCV	1-6	RT,ESF, PAM	~~1yr~~ 4mos	Harsh	Harsh	No (1)	E	I	
93	NFS-LT-471	B – Steam Generator Water Level (Narrow Range)	PCCV	1-6	RT,ESF, PAM	~~1yr~~ 4mos	Harsh	Harsh	No (1)	E	I	
94	NFS-LT-472	B – Steam Generator Water Level (Narrow Range)	PCCV	1-6	RT,ESF, PAM	~~1yr~~ 4mos	Harsh	Harsh	No (1)	E	I	
95	NFS-LT-473	B – Steam Generator Water Level (Narrow Range)	PCCV	1-6	RT,ESF, PAM	~~1yr~~ 4mos	Harsh	Harsh	No (1)	E	I	
96	NFS-LT-474	B – Steam Generator Water Level (Wide Range)	PCCV	1-6	PAM, Other	~~1yr~~ 4mos	Harsh	Harsh	No (1)	E	I	
97	NFS-LT-480	C – Steam Generator Water Level (Narrow Range)	PCCV	1-6	RT,ESF, PAM	~~1yr~~ 4mos	Harsh	Harsh	No (1)	E	I	
98	NFS-LT-481	C – Steam Generator Water Level (Narrow Range)	PCCV	1-6	RT,ESF, PAM	~~1yr~~ 4mos	Harsh	Harsh	No (1)	E	I	
99	NFS-LT-482	C – Steam Generator Water Level (Narrow Range)	PCCV	1-6	RT,ESF, PAM	~~1yr~~ 4mos	Harsh	Harsh	No (1)	E	I	
100	NFS-LT-483	C – Steam Generator Water Level (Narrow Range)	PCCV	1-6	RT,ESF, PAM	~~1yr~~ 4mos	Harsh	Harsh	No (1)	E	I	
101	NFS-LT-484	C – Steam Generator Water Level (Wide Range)	PCCV	1-6	PAM, Other	~~1yr~~ 4mos	Harsh	Harsh	No (1)	E	I	
102	NFS-LT-490	D – Steam Generator Water Level (Narrow Range)	PCCV	1-6	RT,ESF, PAM	~~1yr~~ 4mos	Harsh	Harsh	No (1)	E	I	
103	NFS-LT-491	D – Steam Generator Water Level (Narrow Range)	PCCV	1-6	RT,ESF, PAM	~~1yr~~ 4mos	Harsh	Harsh	No (1)	E	I	
104	NFS-LT-492	D – Steam Generator Water Level (Narrow Range)	PCCV	1-6	RT,ESF, PAM	~~1yr~~ 4mos	Harsh	Harsh	No (1)	E	I	
105	NFS-LT-493	D – Steam Generator Water Level (Narrow Range)	PCCV	1-6	RT,ESF, PAM	~~1yr~~ 4mos	Harsh	Harsh	No (1)	E	I	
106	NFS-LT-494	D – Steam Generator Water Level (Wide Range)	PCCV	1-6	PAM, Other	~~1yr~~ 4mos	Harsh	Harsh	No (1)	E	I	
107	NMS-PT-465	A – Main Steam Line Pressure	R/B	14	ESF,PAM, Other	2wks	Mild	Mild	No (1)	E	I	
108	NMS-PT-466	A – Main Steam Line Pressure	R/B	14	ESF,PAM	2wks	Mild	Mild	No (1)	E	I	
109	NMS-PT-467	A – Main Steam Line Pressure	R/B	14	ESF,PAM	2wks	Mild	Mild	No (1)	E	I	
110	NMS-PT-468	A – Main Steam Line Pressure	R/B	14	ESF,PAM, Other	2wks	Mild	Mild	No (1)	E	I	
111	NMS-PT-475	B – Main Steam Line Pressure	R/B	14	ESF,PAM, Other	2wks	Mild	Mild	No (1)	E	I	
112	NMS-PT-476	B – Main Steam Line Pressure	R/B	14	ESF,PAM	2wks	Mild	Mild	No (1)	E	I	

Table 3D-2 US-APWR Environmental Qualification Equipment List
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Item Num	Equipment Tag	Description	Location (~~PCCV, R/B, A/B, O/B,T/B, UHSRS~~)		Purpose	Operational Duration	Environmental Conditions	Radiation Condition	Influence of Submergence for Total Integrated Dose	Qualification Process	Seismic Category	Comments
			Building	Zone	RT, ESF, PAM, Paressure Boundary (PB), Other		Harsh or Mild	Harsh or Mild	Yes/No	E=Electrical M=Mechanical	I, II, Non	
113	NMS-PT-477	B – Main Steam Line Pressure	R/B	14	ESF,PAM	2wks	Mild	Mild	No (1)	E	I	
114	NMS-PT-478	B – Main Steam Line Pressure	R/B	14	ESF,PAM, Other	2wks	Mild	Mild	No (1)	E	I	
115	NMS-PT-485	C – Main Steam Line Pressure	R/B	14	ESF,PAM, Other	2wks	Mild	Mild	No (1)	E	I	
116	NMS-PT-486	C – Main Steam Line Pressure	R/B	14	ESF,PAM	2wks	Mild	Mild	No (1)	E	I	
117	NMS-PT-487	C – Main Steam Line Pressure	R/B	14	ESF,PAM	2wks	Mild	Mild	No (1)	E	I	
118	NMS-PT-488	C – Main Steam Line Pressure	R/B	14	ESF,PAM, Other	2wks	Mild	Mild	No (1)	E	I	
119	NMS-PT-495	D – Main Steam Line Pressure	R/B	14	ESF,PAM, Other	2wks	Mild	Mild	No (1)	E	I	
120	NMS-PT-496	D – Main Steam Line Pressure	R/B	14	ESF,PAM	2wks	Mild	Mild	No (1)	E	I	
121	NMS-PT-497	D – Main Steam Line Pressure	R/B	14	ESF,PAM	2wks	Mild	Mild	No (1)	E	I	
122	NMS-PT-498	D – Main Steam Line Pressure	R/B	14	ESF,PAM, Other	2wks	Mild	Mild	No (1)	E	I	
123	NMS-PT-505	Turbine Inlet Pressure	T/B	14	RT	5min	Mild	Mild	No (3)	E	Non	
124	NMS-PT-506	Turbine Inlet Pressure	T/B	14	RT	5min	Mild	Mild	No (3)	E	Non	
125	NMS-PT-507	Turbine Inlet Pressure	T/B	14	RT	5min	Mild	Mild	No (3)	E	Non	
126	NMS-PT-508	Turbine Inlet Pressure	T/B	14	RT	5min	Mild	Mild	No (3)	E	Non	
127	CSS-PT-950	Containment Pressure	PCCV, R/B	6	ESF,PAM	~~1yr~~ 4mos	Harsh / Mild	Harsh	No (1)	E	I	Transmitter is located in RB
128	CSS-PT-951	Containment Pressure	PCCV, R/B	6	ESF,PAM	~~1yr~~ 4mos	Harsh / Mild	Harsh	No (1)	E	I	Transmitter is located in RB
129	CSS-PT-952	Containment Pressure	PCCV, R/B	6	ESF,PAM	~~1yr~~ 4mos	Harsh / Mild	Harsh	No (1)	E	I	Transmitter is located in RB
130	CSS-PT-953	Containment Pressure	PCCV, R/B	6	ESF,PAM	~~1yr~~ 4mos	Harsh / Mild	Harsh	No (1)	E	I	Transmitter is located in RB
131	NCS-FT-1224	A – Component Cooling Water Header Flow	R/B	8	Other	36hr	Mild	Harsh	No (1)	E	I	
132	NCS-FT-1225	B – Component Cooling Water Header Flow	R/B	8	Other	36hr	Mild	Harsh	No (1)	E	I	
133	NCS-FT-1227	C – Component Cooling Water Header Flow	R/B	8	Other	36hr	Mild	Harsh	No (1)	E	I	
134	NCS-FT-1228	D – Component Cooling Water Header Flow	R/B	8	Other	36hr	Mild	Harsh	No (1)	E	I	
135	NCS-LT-1200	A – Component Cooling Water Surge Tank Water Level	R/B	8	Other	36hr	Mild	Harsh	No (1)	E	I	

Table 3D-2 US-APWR Environmental Qualification Equipment List
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Item Num	Equipment Tag	Description	Location (~~PCCV, R/B, A/B, O/B,T/B, UHSRS~~)		Purpose	Operational Duration	Environmental Conditions	Radiation Condition	Influence of Submergence for Total Integrated Dose	Qualification Process	Seismic Category	Comments
			Building	Zone	RT, ESF, PAM, Paressure Boundary (PB), Other		Harsh or Mild	Harsh or Mild	Yes/No	E=Electrical M=Mechanical	I, II, Non	
136	NCS-LT-1201	A - Component Cooling Water Surge Tank Water Level	R/B	8	Other	36hr	Mild	Harsh	No (1)	E	I	
137	NCS-LT-1210	B - Component Cooling Water Surge Tank Water Level	R/B	8	Other	36hr	Mild	Harsh	No (1)	E	I	
138	NCS-LT-1211	B - Component Cooling Water Surge Tank Water Level	R/B	8	Other	36hr	Mild	Harsh	No (1)	E	I	
139	NCS-PT-1220	A - Component Cooling Water Header Pressure	R/B	8	PAM, Other	~~2wks~~4mos	Mild	Harsh	No (1)	E	I	
140	NCS-PT-1221	B - Component Cooling Water Header Pressure	R/B	8	PAM, Other	~~2wks~~4mos	Mild	Harsh	No (1)	E	I	
141	NCS-PT-1222	C - Component Cooling Water Header Pressure	R/B	8	PAM, Other	~~2wks~~4mos	Mild	Harsh	No (1)	E	I	
142	NCS-PT-1223	D - Component Cooling Water Header Pressure	R/B	8	PAM, Other	~~2wks~~4mos	Mild	Harsh	No (1)	E	I	
143	EWS-FT-2024	A - Component Cooling Water Heat Exchanger Essential Service Water Flow	R/B	8	Other	36hr	Mild	Harsh	No (1)	E	I	
144	EWS-FT-2025	B - Component Cooling Water Heat Exchanger Essential Service Water Flow	R/B	8	Other	36hr	Mild	Harsh	No (1)	E	I	
145	EWS-FT-2026	C - Component Cooling Water Heat Exchanger Essential Service Water Flow	R/B	8	Other	36hr	Mild	Harsh	No (1)	E	I	
146	EWS-FT-2027	D - Component Cooling Water Heat Exchanger Essential Service Water Flow	R/B	8	Other	36hr	Mild	Harsh	No (1)	E	I	
147	EWS-PT-2005	A - Essential Service Water Header Pressure	~~R/B~~ UHSRS	-	PAM, Other	2wks	Mild	-	-	E	I	
148	EWS-PT-2006	B - Essential Service Water Header Pressure	~~R/B~~ UHSRS	-	PAM, Other	2wks	Mild	-	-	E	I	
149	EWS-PT-2007	C - Essential Service Water Header Pressure	~~R/B~~ UHSRS	-	PAM, Other	2wks	Mild	-	-	E	I	
150	EWS-PT-2008	D - Essential Service Water Header Pressure	~~R/B~~ UHSRS	-	PAM, Other	2wks	Mild	-	-	E	I	
151	RWS-LT-1400	Refueling Water Storage Pit Water Level (Narrow Range)	PCCV	1-5	PAM	~~1yr~~ 4mos	Harsh	Harsh	No (1)	E	I	

Table 3D-2 US-APWR Environmental Qualification Equipment List
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Item Num	Equipment Tag	Description	Location (~~PCCV, R/B, A/B, O/B,T/B, UHSRS~~)		Purpose	Operational Duration	Environmental Conditions	Radiation Condition	Influence of Submergence for Total Integrated Dose	Qualification Process	Seismic Category	Comments
			Building	Zone	RT, ESF, PAM, Paressure Boundary (PB), Other		Harsh or Mild	Harsh or Mild	Yes/No	E=Electrical M=Mechanical	I, II, Non	
152	RWS-LT-1401	Refueling Water Storage Pit Water Level (Wide Range)	PCCV	1-5	PAM, Other	~~1yr~~ 4mos	Harsh	Harsh	No (1)	E	I	
153	RWS-LT-1402	Refueling Water Storage Pit Water Level (Narrow Range)	PCCV	1-5	PAM	~~1yr~~ 4mos	Harsh	Harsh	No (1)	E	I	
154	RWS-LT-1403	Refueling Water Storage Pit Water Level (Wide Range)	PCCV	1-5	PAM, Other	~~1yr~~ 4mos	Harsh	Harsh	No (1)	E	I	
Instruments (Resistance Temperature Detectors)												
1	RCS-TE-410	Loop A - Reactor Coolant Hot Leg Temperature (Wide Range)	PCCV	1-3	PAM, Other	~~1yr~~ 4mos	Harsh	Harsh	No (1)	E	I	
2	RCS-TE-411A	Loop A - Reactor Coolant Hot Leg Temperature (Narrow Range)	PCCV	1-3	RT	5min	Harsh	Harsh	No (1)	E	I	
3	RCS-TE-411B	Loop A - Reactor Coolant Hot Leg Temperature (Narrow Range)	PCCV	1-3	RT	5min	Harsh	Harsh	No (1)	E	I	
4	RCS-TE-411C	Loop A - Reactor Coolant Hot Leg Temperature (Narrow Range)	PCCV	1-3	RT	5min	Harsh	Harsh	No (1)	E	I	
5	RCS-TE-411D	Loop A - Reactor Coolant Cold Leg Temperature (Narrow Range)	PCCV	1-3	RT	5min	Harsh	Harsh	No (1)	E	I	
6	RCS-TE-413A	Loop A - Reactor Coolant Hot Leg Temperature (Narrow Range) (spare)	PCCV	1-3	RT	5min	Harsh	Harsh	No (1)	E	I	
7	RCS-TE-413B	Loop A - Reactor Coolant Hot Leg Temperature (Narrow Range) (spare)	PCCV	1-3	RT	5min	Harsh	Harsh	No (1)	E	I	
8	RCS-TE-413C	Loop A - Reactor Coolant Hot Leg Temperature (Narrow Range) (spare)	PCCV	1-3	RT	5min	Harsh	Harsh	No (1)	E	I	
9	RCS-TE-413D	Loop A - Reactor Coolant Cold Leg Temperature (Narrow Range) (spare)	PCCV	1-3	RT	5min	Harsh	Harsh	No (1)	E	I	
10	RCS-TE-415	Loop A - Reactor Coolant Cold Leg Temperature (Wide Range)	PCCV	1-3	PAM, Other	~~1yr~~ 4mos	Harsh	Harsh	No (1)	E	I	
11	RCS-TE-420	Loop B - Reactor Coolant Hot Leg Temperature (Wide Range)	PCCV	1-3	PAM, Other	~~1yr~~ 4mos	Harsh	Harsh	No (1)	E	I	
12	RCS-TE-421A	Loop B - Reactor Coolant Hot Leg Temperature (Narrow Range)	PCCV	1-3	RT	5min	Harsh	Harsh	No (1)	E	I	

Table 3D-2 US-APWR Environmental Qualification Equipment List
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Item Num	Equipment Tag	Description	Location (~~PCCV, R/B, A/B, O/B,T/B, UHSRS~~)		Purpose	Operational Duration	Environmental Conditions	Radiation Condition	Influence of Submergence for Total Integrated Dose	Qualification Process	Seismic Category	Comments
			Building	Zone	RT, ESF, PAM, Paressure Boundary (PB), Other		Harsh or Mild	Harsh or Mild	Yes/No	E=Electrical M=Mechanical	I, II, Non	
13	RCS-TE-421B	Loop B - Reactor Coolant Hot Leg Temperature (Narrow Range)	PCCV	1-3	RT	5min	Harsh	Harsh	No (1)	E	I	
14	RCS-TE-421C	Loop B - Reactor Coolant Hot Leg Temperature (Narrow Range)	PCCV	1-3	RT	5min	Harsh	Harsh	No (1)	E	I	
15	RCS-TE-421D	Loop B - Reactor Coolant Cold Leg Temperature (Narrow Range)	PCCV	1-3	RT	5min	Harsh	Harsh	No (1)	E	I	
16	RCS-TE-423A	Loop B - Reactor Coolant Hot Leg Temperature (Narrow Range) (spare)	PCCV	1-3	RT	5min	Harsh	Harsh	No (1)	E	I	
17	RCS-TE-423B	Loop B - Reactor Coolant Hot Leg Temperature (Narrow Range) (spare)	PCCV	1-3	RT	5min	Harsh	Harsh	No (1)	E	I	
18	RCS-TE-423C	Loop B - Reactor Coolant Hot Leg Temperature (Narrow Range) (spare)	PCCV	1-3	RT	5min	Harsh	Harsh	No (1)	E	I	
19	RCS-TE-423D	Loop B - Reactor Coolant Cold Leg Temperature (Narrow Range) (spare)	PCCV	1-3	RT	5min	Harsh	Harsh	No (1)	E	I	
20	RCS-TE-425	Loop B - Reactor Coolant Cold Leg Temperature (Wide Range)	PCCV	1-3	PAM, Other	~~1yr~~ 4mos	Harsh	Harsh	No (1)	E	I	
21	RCS-TE-430	Loop C - Reactor Coolant Hot Leg Temperature (Wide Range)	PCCV	1-3	PAM, Other	~~1yr~~ 4mos	Harsh	Harsh	No (1)	E	I	
22	RCS-TE-431A	Loop C - Reactor Coolant Hot Leg Temperature (Narrow Range)	PCCV	1-3	RT	5min	Harsh	Harsh	No (1)	E	I	
23	RCS-TE-431B	Loop C - Reactor Coolant Hot Leg Temperature (Narrow Range)	PCCV	1-3	RT	5min	Harsh	Harsh	No (1)	E	I	
24	RCS-TE-431C	Loop C - Reactor Coolant Hot Leg Temperature (Narrow Range)	PCCV	1-3	RT	5min	Harsh	Harsh	No (1)	E	I	
25	RCS-TE-431D	Loop C - Reactor Coolant Cold Leg Temperature (Narrow Range)	PCCV	1-3	RT	5min	Harsh	Harsh	No (1)	E	I	
26	RCS-TE-433A	Loop C - Reactor Coolant Hot Leg Temperature (Narrow Range) (spare)	PCCV	1-3	RT	5min	Harsh	Harsh	No (1)	E	I	
27	RCS-TE-433B	Loop C - Reactor Coolant Hot Leg Temperature (Narrow Range) (spare)	PCCV	1-3	RT	5min	Harsh	Harsh	No (1)	E	I	

Attachment 1
to RAI 358-2462

Table 3D-2 US-APWR Environmental Qualification Equipment List
(Sheet 11 of 64)

Item Num	Equipment Tag	Description	Location (~~PCCV, R/B, A/B, O/B,T/B, UHSRS~~)		Purpose	Operational Duration	Environmental Conditions	Radiation Condition	Influence of Submergence for Total Integrated Dose	Qualification Process	Seismic Category	Comments
			Building	Zone	RT, ESF, PAM, Paressure Boundary (PB), Other		Harsh or Mild	Harsh or Mild	Yes/No	E=Electrical M=Mechanical	I, II, Non	
28	RCS-TE-433C	Loop C - Reactor Coolant Hot Leg Temperature (Narrow Range) (spare)	PCCV	1-3	RT	5min	Harsh	Harsh	No (1)	E	I	
29	RCS-TE-433D	Loop C - Reactor Coolant Cold Leg Temperature (Narrow Range) (spare)	PCCV	1-3	RT	5min	Harsh	Harsh	No (1)	E	I	
30	RCS-TE-435	Loop C - Reactor Coolant Cold Leg Temperature (Wide Range)	PCCV	1-3	PAM, Other	~~1yr 4~~mos	Harsh	Harsh	No (1)	E	I	
31	RCS-TE-440	Loop D - Reactor Coolant Hot Leg Temperature (Wide Range)	PCCV	1-3	PAM, Other	~~1yr 4~~mos	Harsh	Harsh	No (1)	E	I	
32	RCS-TE-441A	Loop D - Reactor Coolant Hot Leg Temperature (Narrow Range)	PCCV	1-3	RT	5min	Harsh	Harsh	No (1)	E	I	
33	RCS-TE-441B	Loop D - Reactor Coolant Hot Leg Temperature (Narrow Range)	PCCV	1-3	RT	5min	Harsh	Harsh	No (1)	E	I	
34	RCS-TE-441C	Loop D - Reactor Coolant Hot Leg Temperature (Narrow Range)	PCCV	1-3	RT	5min	Harsh	Harsh	No (1)	E	I	
35	RCS-TE-441D	Loop D - Reactor Coolant Cold Leg Temperature (Narrow Range)	PCCV	1-3	RT	5min	Harsh	Harsh	No (1)	E	I	
36	RCS-TE-443A	Loop D - Reactor Coolant Hot Leg Temperature (Narrow Range) (spare)	PCCV	1-3	RT	5min	Harsh	Harsh	No (1)	E	I	
37	RCS-TE-443B	Loop D - Reactor Coolant Hot Leg Temperature (Narrow Range) (spare)	PCCV	1-3	RT	5min	Harsh	Harsh	No (1)	E	I	
38	RCS-TE-443C	Loop D - Reactor Coolant Hot Leg Temperature (Narrow Range) (spare)	PCCV	1-3	RT	5min	Harsh	Harsh	No (1)	E	I	
39	RCS-TE-443D	Loop D - Reactor Coolant Cold Leg Temperature (Narrow Range) (spare)	PCCV	1-3	RT	5min	Harsh	Harsh	No (1)	E	I	
40	RCS-TE-445	Loop D - Reactor Coolant Cold Leg Temperature (Wide Range)	PCCV	1-3	PAM, Other	~~1yr 4~~mos	Harsh	Harsh	No (1)	E	I	
41	RHS-TE-604	A - Containment Spray / Residual Heat Removal Heat Exhanger Outlet Temperature	R/B	6	Other	36hr	Mild	Harsh	No (1)	E	I	

Table 3D-2 US-APWR Environmental Qualification Equipment List
(Sheet 12 of 64)

Item Num	Equipment Tag	Description	Location (~~PCCV, R/B, A/B, O/B,T/B, UHSRS~~)		Purpose	Operational Duration	Environmental Conditions	Radiation Condition	Influence of Submergence for Total Integrated Dose	Qualification Process	Seismic Category	Comments
			Building	Zone	RT, ESF, PAM, Paressure Boundary (PB), Other		Harsh or Mild	Harsh or Mild	Yes/No	E=Electrical M=Mechanical	I, II, Non	
42	RHS-TE-614	B - Containment Spray / Residual Heat Removal Heat Exhanger Outlet Temperature	R/B	6	Other	36hr	Mild	Harsh	No (1)	E	I	
43	RHS-TE-624	C - Containment Spray / Residual Heat Removal Heat Exhanger Outlet Temperature	R/B	6	Other	36hr	Mild	Harsh	No (1)	E	I	
44	RHS-TE-634	D - Containment Spray / Residual Heat Removal Heat Exhanger Outlet Temperature	R/B	6	Other	36hr	Mild	Harsh	No (1)	E	I	
45	CSS-TE-1990	Containment Temperature	PCCV	1-6	PAM	~~1yr~~ 4mos	Harsh	Harsh	No (1)	E	I	
46	NCS-TE-1215	A - Component Cooling Water Supply Temperature	R/B	8	Other	36hr	Mild	Harsh	No (1)	E	I	
47	NCS-TE-1216	B - Component Cooling Water Supply Temperature	R/B	8	Other	36hr	Mild	Harsh	No (1)	E	I	
48	NCS-TE-1217	C - Component Cooling Water Supply Temperature	R/B	8	Other	36hr	Mild	Harsh	No (1)	E	I	
49	NCS-TE-1218	D - Component Cooling Water Supply Temperature	R/B	8	Other	36hr	Mild	Harsh	No (1)	E	I	
Instruments (Speed Sensors)												
1	RCS-SE-418A	A - Reactor Coolant Pump Speed	PCCV	1-4	RT	5min*	Harsh	Harsh	No (1)	E	I	*Not required post accident
2	RCS-SE-418B	A - Reactor Coolant Pump Speed (spare)	PCCV	1-4	RT	5min*	Harsh	Harsh	No (1)	E	I	*Not required post accident
3	RCS-SE-428A	B - Reactor Coolant Pump Speed	PCCV	1-4	RT	5min*	Harsh	Harsh	No (1)	E	I	*Not required post accident
4	RCS-SE-428B	B - Reactor Coolant Pump Speed (spare)	PCCV	1-4	RT	5min*	Harsh	Harsh	No (1)	E	I	*Not required post accident
5	RCS-SE-438A	C - Reactor Coolant Pump Speed	PCCV	1-4	RT	5min*	Harsh	Harsh	No (1)	E	I	*Not required post accident
6	RCS-SE-438B	C - Reactor Coolant Pump Speed (spare)	PCCV	1-4	RT	5min*	Harsh	Harsh	No (1)	E	I	*Not required post accident
7	RCS-SE-448A	D - Reactor Coolant Pump Speed	PCCV	1-4	RT	5min*	Harsh	Harsh	No (1)	E	I	*Not required post accident
8	RCS-SE-448B	D - Reactor Coolant Pump Speed (spare)	PCCV	1-4	RT	5min*	Harsh	Harsh	No (1)	E	I	*Not required post accident

Table 3D-2 US-APWR Environmental Qualification Equipment List
(Sheet 13 of 64)

Item Num	Equipment Tag	Description	Location (~~PCCV, R/B, A/B, O/B,T/B, UHSRS~~)		Purpose	Operational Duration	Environmental Conditions	Radiation Condition	Influence of Submergence for Total Integrated Dose	Qualification Process	Seismic Category	Comments
			Building	Zone	RT, ESF, PAM, Paressure Boundary (PB), Other		Harsh or Mild	Harsh or Mild	Yes/No	E=Electrical M=Mechanical	I, II, Non	
Instruments (Neutron Detectors)												
1	CIS-NE-31	Source Range Neutron Flux	PCCV	1-2	RT, Other	36hr*	Harsh	Harsh	No (2)	E	I	*Not required post accident
2	CIS-NE-32	Source Range Neutron Flux	PCCV	1-2	RT, Other	36hr*	Harsh	Harsh	No (2)	E	I	*Not required post accident
3	CIS-NE-35	Intermediate Range Neutron Flux	PCCV	1-2	RT	5min*	Harsh	Harsh	No (1)	E	I	*Not required post accident
4	CIS-NE-36	Intermediate Range Neutron Flux	PCCV	1-2	RT	5min*	Harsh	Harsh	No (1)	E	I	*Not required post accident
5	CIS-NE-41A	Power Range Neutron Flux (Upper)	PCCV	1-2	RT	5min*	Harsh	Harsh	No (1)	E	I	*Not required post accident
6	CIS-NE-41B	Power Range Neutron Flux (Lower)	PCCV	1-2	RT	5min*	Harsh	Harsh	No (2)	E	I	*Not required post accident
7	CIS-NE-42A	Power Range Neutron Flux (Upper)	PCCV	1-2	RT	5min*	Harsh	Harsh	No (1)	E	I	*Not required post accident
8	CIS-NE-42B	Power Range Neutron Flux (Lower)	PCCV	1-2	RT	5min*	Harsh	Harsh	No (2)	E	I	*Not required post accident
9	CIS-NE-43A	Power Range Neutron Flux (Upper)	PCCV	1-2	RT	5min*	Harsh	Harsh	No (1)	E	I	*Not required post accident
10	CIS-NE-43B	Power Range Neutron Flux (Lower)	PCCV	1-2	RT	5min*	Harsh	Harsh	No (2)	E	I	*Not required post accident
11	CIS-NE-44A	Power Range Neutron Flux (Upper)	PCCV	1-2	RT	5min*	Harsh	Harsh	No (1)	E	I	*Not required post accident
12	CIS-NE-44B	Power Range Neutron Flux (Lower)	PCCV	1-2	RT	5min*	Harsh	Harsh	No (2)	E	I	*Not required post accident
13	CIS-NE-33	Wide Range Neutron Flux	PCCV	1-2	PAM	~~1yr~~ 4mos	Harsh	Harsh	No (1)	E	I	
14	CIS-NE-34	Wide Range Neutron Flux	PCCV	1-2	PAM	~~1yr~~ 4mos	Harsh	Harsh	No (1)	E	I	
Instruments (Thermocouples)												
1	RCS-LE-571	Reactor Vessel Water Level	PCCV	1-3	PAM	~~1yr~~ 4mos	Harsh	Harsh	No (1)	E	I	Heated Junction Thermocouples
2	RCS-LE-572	Reactor Vessel Water Level	PCCV	1-3	PAM	~~1yr~~ 4mos	Harsh	Harsh	No (1)	E	I	Heated Junction Thermocouples
3	CIS-TE-01	Core Exit Temperature	PCCV	1-3	PAM	~~1yr~~ 4mos	Harsh	Harsh	No (1)	E	I	

Table 3D-2 US-APWR Environmental Qualification Equipment List
(Sheet 14 of 64)

Item Num	Equipment Tag	Description	Location (~~PCCV, R/B, A/B, O/B,T/B, UHSRS~~)		Purpose	Operational Duration	Environmental Conditions	Radiation Condition	Influence of Submergence for Total Integrated Dose	Qualification Process	Seismic Category	Comments
			Building	Zone	RT, ESF, PAM, Paressure Boundary (PB), Other		Harsh or Mild	Harsh or Mild	Yes/No	E=Electrical M=Mechanical	I, II, Non	
4	CIS-TE-02	Core Exit Temperature	PCCV	1-3	PAM	~~1yr~~ 4mos	Harsh	Harsh	No (1)	E	I	
5	CIS-TE-03	Core Exit Temperature	PCCV	1-3	PAM	~~1yr~~ 4mos	Harsh	Harsh	No (1)	E	I	
6	CIS-TE-04	Core Exit Temperature	PCCV	1-3	PAM	~~1yr~~ 4mos	Harsh	Harsh	No (1)	E	I	
7	CIS-TE-05	Core Exit Temperature	PCCV	1-3	PAM	~~1yr~~ 4mos	Harsh	Harsh	No (1)	E	I	
8	CIS-TE-06	Core Exit Temperature	PCCV	1-3	PAM	~~1yr~~ 4mos	Harsh	Harsh	No (1)	E	I	
9	CIS-TE-07	Core Exit Temperature	PCCV	1-3	PAM	~~1yr~~ 4mos	Harsh	Harsh	No (1)	E	I	
10	CIS-TE-08	Core Exit Temperature	PCCV	1-3	PAM	~~1yr~~ 4mos	Harsh	Harsh	No (1)	E	I	
11	CIS-TE-09	Core Exit Temperature	PCCV	1-3	PAM	~~1yr~~ 4mos	Harsh	Harsh	No (1)	E	I	
12	CIS-TE-10	Core Exit Temperature	PCCV	1-3	PAM	~~1yr~~ 4mos	Harsh	Harsh	No (1)	E	I	
13	CIS-TE-11	Core Exit Temperature	PCCV	1-3	PAM	~~1yr~~ 4mos	Harsh	Harsh	No (1)	E	I	
14	CIS-TE-12	Core Exit Temperature	PCCV	1-3	PAM	~~1yr~~ 4mos	Harsh	Harsh	No (1)	E	I	
15	CIS-TE-13	Core Exit Temperature	PCCV	1-3	PAM	~~1yr~~ 4mos	Harsh	Harsh	No (1)	E	I	
16	CIS-TE-14	Core Exit Temperature	PCCV	1-3	PAM	~~1yr~~ 4mos	Harsh	Harsh	No (1)	E	I	
17	CIS-TE-15	Core Exit Temperature	PCCV	1-3	PAM	~~1yr~~ 4mos	Harsh	Harsh	No (1)	E	I	
18	CIS-TE-16	Core Exit Temperature	PCCV	1-3	PAM	~~1yr~~ 4mos	Harsh	Harsh	No (1)	E	I	
19	CIS-TE-17	Core Exit Temperature	PCCV	1-3	PAM	~~1yr~~ 4mos	Harsh	Harsh	No (1)	E	I	
20	CIS-TE-18	Core Exit Temperature	PCCV	1-3	PAM	~~1yr~~ 4mos	Harsh	Harsh	No (1)	E	I	
21	CIS-TE-19	Core Exit Temperature	PCCV	1-3	PAM	~~1yr~~ 4mos	Harsh	Harsh	No (1)	E	I	
22	CIS-TE-20	Core Exit Temperature	PCCV	1-3	PAM	~~1yr~~ 4mos	Harsh	Harsh	No (1)	E	I	
23	CIS-TE-21	Core Exit Temperature	PCCV	1-3	PAM	~~1yr~~ 4mos	Harsh	Harsh	No (1)	E	I	
24	CIS-TE-22	Core Exit Temperature	PCCV	1-3	PAM	~~1yr~~ 4mos	Harsh	Harsh	No (1)	E	I	
25	CIS-TE-23	Core Exit Temperature	PCCV	1-3	PAM	~~1yr~~ 4mos	Harsh	Harsh	No (1)	E	I	
26	CIS-TE-24	Core Exit Temperature	PCCV	1-3	PAM	~~1yr~~ 4mos	Harsh	Harsh	No (1)	E	I	

Table 3D-2 US-APWR Environmental Qualification Equipment List
(Sheet 15 of 64)

Item Num	Equipment Tag	Description	Location (~~PCCV, R/B, A/B, O/B,T/B, UHSRS~~)		Purpose	Operational Duration	Environmental Conditions	Radiation Condition	Influence of Submergence for Total Integrated Dose	Qualification Process	Seismic Category	Comments
			Building	Zone	RT, ESF, PAM, Paressure Boundary (PB), Other		Harsh or Mild	Harsh or Mild	Yes/No	E=Electrical M=Mechanical	I, II, Non	
27	CIS-TE-25	Core Exit Temperature	PCCV	1-3	PAM	~~1yr~~ 4mos	Harsh	Harsh	No (1)	E	I	
28	CIS-TE-26	Core Exit Temperature	PCCV	1-3	PAM	~~1yr~~ 4mos	Harsh	Harsh	No (1)	E	I	
Instruments (Radiation Monitors)												
1	RMS-RE-83A	Main Control Room Outside Air Intake Particulate Radiation	R/B	14	ESF	30min	Mild	Mild	No (1)	E	I	
2	RMS-RE-83B	Main Control Room Outside Air Intake Particulate Radiation	R/B	14	ESF	30min	Mild	Mild	No (1)	E	I	
3	RMS-RE-84A	Main Control Room Outside Air Intake Gas Radiation	R/B	14	ESF	30min	Mild	Mild	No (1)	E	I	
4	RMS-RE-84B	Main Control Room Outside Air Intake Gas Radiation	R/B	14	ESF	30min	Mild	Mild	No (1)	E	I	
5	RMS-RE-85A	Main Control Room Outside Air Intake Iodine Radiation	R/B	14	ESF	30min	Mild	Mild	No (1)	E	I	
6	RMS-RE-85B	Main Control Room Outside Air Intake Iodine Radiation	R/B	14	ESF	30min	Mild	Mild	No (1)	E	I	
7	RMS-RE-91	Containment High Range Area Radiation	PCCV	1-6	ESF PAM	~~1yr~~ 4mos	Harsh	Harsh	No (1)	E	I	
8	RMS-RE-92	Containment High Range Area Radiation	PCCV	1-6	ESF PAM	~~1yr~~ 4mos	Harsh	Harsh	No (1)	E	I	
9	RMS-RE-93	Containment High Range Area Radiation	PCCV	1-6	ESF PAM	~~1yr~~ 4mos	Harsh	Harsh	No (1)	E	I	
10	RMS-RE-94	Containment High Range Area Radiation	PCCV	1-6	ESF PAM	~~1yr~~ 4mos	Harsh	Harsh	No (1)	E	I	
Instruments (Switches)												
1	VRS-TS-2330	A - Penetration Area Temperature	R/B	6	Other	1yr	Mild	Harsh	No (1)	E	I	
2	VRS-TS-2333	A - Penetration Area Temperature	R/B	6	Other	1yr	Mild	Harsh	No (1)	E	I	
3	VRS-TS-2334	A - Penetration Area Temperature	R/B	6	Other	1yr	Mild	Harsh	No (1)	E	I	
4	VRS-TS-2335	B - Penetration Area Temperature	R/B	6	Other	1yr	Mild	Harsh	No (1)	E	I	
5	VRS-TS-2338	B - Penetration Area Temperature	R/B	6	Other	1yr	Mild	Harsh	No (1)	E	I	
6	VRS-TS-2339	B - Penetration Area Temperature	R/B	6	Other	1yr	Mild	Harsh	No (1)	E	I	
7	VRS-TS-2340	C - Penetration Area Temperature	R/B	6	Other	1yr	Mild	Harsh	No (1)	E	I	

Table 3D-2 US-APWR Environmental Qualification Equipment List
(Sheet 16 of 64)

Item Num	Equipment Tag	Description	Location (~~PCCV, R/B, A/B, O/B,T/B, UHSRS~~)		Purpose	Operational Duration	Environmental Conditions	Radiation Condition	Influence of Submergence for Total Integrated Dose	Qualification Process	Seismic Category	Comments
			Building	Zone	RT, ESF, PAM, Paressure Boundary (PB), Other		Harsh or Mild	Harsh or Mild	Yes/No	E=Electrical M=Mechanical	I, II, Non	
8	VRS-TS-2343	C - Penetration Area Temperature	R/B	6	Other	1yr	Mild	Harsh	No (1)	E	I	
9	VRS-TS-2344	C - Penetration Area Temperature	R/B	6	Other	1yr	Mild	Harsh	No (1)	E	I	
10	VRS-TS-2345	D - Penetration Area Temperature	R/B	6	Other	1yr	Mild	Harsh	No (1)	E	I	
11	VRS-TS-2348	D - Penetration Area Temperature	R/B	6	Other	1yr	Mild	Harsh	No (1)	E	I	
12	VRS-TS-2349	D - Penetration Area Temperature	R/B	6	Other	1yr	Mild	Harsh	No (1)	E	I	
13	VRS-TS-2572	A - Safeguard Component Area Temperature	R/B	6	Other	1yr	Mild	Harsh	No (1)	E	I	
14	VRS-TS-2573	A - Safeguard Component Area Temperature	R/B	6	Other	1yr	Mild	Harsh	No (1)	E	I	
15	VRS-TS-2575	A - Safeguard Component Area Temperature	R/B	6	Other	1yr	Mild	Harsh	No (1)	E	I	
16	VRS-TS-2582	B - Safeguard Component Area Temperature	R/B	6	Other	1yr	Mild	Harsh	No (1)	E	I	
17	VRS-TS-2583	B - Safeguard Component Area Temperature	R/B	6	Other	1yr	Mild	Harsh	No (1)	E	I	
18	VRS-TS-2585	B - Safeguard Component Area Temperature	R/B	6	Other	1yr	Mild	Harsh	No (1)	E	I	
19	VRS-TS-2592	C - Safeguard Component Area Temperature	R/B	6	Other	1yr	Mild	Harsh	No (1)	E	I	
20	VRS-TS-2593	C - Safeguard Component Area Temperature	R/B	6	Other	1yr	Mild	Harsh	No (1)	E	I	
21	VRS-TS-2595	C - Safeguard Component Area Temperature	R/B	6	Other	1yr	Mild	Harsh	No (1)	E	I	
22	VRS-TS-2602	D - Safeguard Component Area Temperature	R/B	6	Other	1yr	Mild	Harsh	No (1)	E	I	
23	VRS-TS-2603	D - Safeguard Component Area Temperature	R/B	6	Other	1yr	Mild	Harsh	No (1)	E	I	
24	VRS-TS-2605	D - Safeguard Component Area Temperature	R/B	6	Other	1yr	Mild	Harsh	No (1)	E	I	
25	VRS-TS-2670	A - Emergency Feedwater Pump Area Temperature	R/B	8	Other	~~2wks~~1yr	Mild	Harsh	No (1)	E	I	
26	VRS-TS-2673	A - Emergency Feedwater Pump Area Temperature	R/B	8	Other	~~2wks~~1yr	Mild	Harsh	No (1)	E	I	

Table 3D-2 US-APWR Environmental Qualification Equipment List
(Sheet 17 of 64)

Item Num	Equipment Tag	Description	Location (~~PCCV, R/B, A/B, O/B,T/B, UHSRS~~)		Purpose	Operational Duration	Environmental Conditions	Radiation Condition	Influence of Submergence for Total Integrated Dose	Qualification Process	Seismic Category	Comments
			Building	Zone	RT, ESF, PAM, Paressure Boundary (PB), Other		Harsh or Mild	Harsh or Mild	Yes/No	E=Electrical M=Mechanical	I, II, Non	
27	VRS-TS-2674	A - Emergency Feedwater Pump Area Temperature	R/B	8	Other	~~2wks~~1yr	Mild	Harsh	No (1)	E	I	
28	VRS-TS-2675	B - Emergency Feedwater Pump Area Temperature	R/B	8	Other	~~2wks~~1yr	Mild	Harsh	No (1)	E	I	
29	VRS-TS-2678	B - Emergency Feedwater Pump Area Temperature	R/B	8	Other	~~2wks~~1yr	Mild	Harsh	No (1)	E	I	
30	VRS-TS-2679	B - Emergency Feedwater Pump Area Temperature	R/B	8	Other	~~2wks~~1yr	Mild	Harsh	No (1)	E	I	
31	VRS-TS-2680	C - Emergency Feedwater Pump Area Temperature	R/B	8	Other	~~2wks~~1yr	Mild	Harsh	No (1)	E	I	
32	VRS-TS-2683	C - Emergency Feedwater Pump Area Temperature	R/B	8	Other	~~2wks~~1yr	Mild	Harsh	No (1)	E	I	
33	VRS-TS-2684	C - Emergency Feedwater Pump Area Temperature	R/B	8	Other	~~2wks~~1yr	Mild	Harsh	No (1)	E	I	
34	VRS-TS-2685	D - Emergency Feedwater Pump Area Temperature	R/B	8	Other	~~2wks~~1yr	Mild	Harsh	No (1)	E	I	
35	VRS-TS-2688	D - Emergency Feedwater Pump Area Temperature	R/B	8	Other	~~2wks~~1yr	Mild	Harsh	No (1)	E	I	
36	VRS-TS-2689	D - Emergency Feedwater Pump Area Temperature	R/B	8	Other	~~2wks~~1yr	Mild	Harsh	No (1)	E	I	
37	VRS-TS-2720A	A - Component Cooling Water Pump Area Temperature	R/B	8	Other	~~2wks~~1yr	Mild	Harsh	No (1)	E	I	
38	VRS-TS-2723A	A - Component Cooling Water Pump Area Temperature	R/B	8	Other	~~2wks~~1yr	Mild	Harsh	No (1)	E	I	
39	VRS-TS-2724A	A - Component Cooling Water Pump Area Temperature	R/B	8	Other	~~2wks~~1yr	Mild	Harsh	No (1)	E	I	
40	VRS-TS-2720B	B - Component Cooling Water Pump Area Temperature	R/B	8	Other	~~2wks~~1yr	Mild	Harsh	No (1)	E	I	
41	VRS-TS-2723B	B - Component Cooling Water Pump Area Temperature	R/B	8	Other	~~2wks~~1yr	Mild	Harsh	No (1)	E	I	
42	VRS-TS-2724B	B - Component Cooling Water Pump Area Temperature	R/B	8	Other	~~2wks~~1yr	Mild	Harsh	No (1)	E	I	
43	VRS-TS-2720C	C - Component Cooling Water Pump Area Temperature	R/B	8	Other	~~2wks~~1yr	Mild	Harsh	No (1)	E	I	
44	VRS-TS-2723C	C - Component Cooling Water Pump Area Temperature	R/B	8	Other	~~2wks~~1yr	Mild	Harsh	No (1)	E	I	

Table 3D-2 US-APWR Environmental Qualification Equipment List
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Item Num	Equipment Tag	Description	Location (~~PCCV, R/B, A/B, O/B,T/B, UHSRS~~)		Purpose	Operational Duration	Environmental Conditions	Radiation Condition	Influence of Submergence for Total Integrated Dose	Qualification Process	Seismic Category	Comments
			Building	Zone	RT, ESF, PAM, Paressure Boundary (PB), Other		Harsh or Mild	Harsh or Mild	Yes/No	E=Electrical M=Mechanical	I, II, Non	
45	VRS-TS-2724C	C - Component Cooling Water Pump Area Temperature	R/B	8	Other	~~2wks~~1yr	Mild	Harsh	No (1)	E	I	
46	VRS-TS-2720D	D - Component Cooling Water Pump Area Temperature	R/B	8	Other	~~2wks~~1yr	Mild	Harsh	No (1)	E	I	
47	VRS-TS-2723D	D - Component Cooling Water Pump Area Temperature	R/B	8	Other	~~2wks~~1yr	Mild	Harsh	No (1)	E	I	
48	VRS-TS-2724D	D - Component Cooling Water Pump Area Temperature	R/B	8	Other	~~2wks~~1yr	Mild	Harsh	No (1)	E	I	
49	VRS-TS-2725A	A - Essential Chiller Unit Area Temperature	~~R/B~~ PS/B	9	Other	2wks	Mild	Mild	No (1)	E	I	
50	VRS-TS-2728A	A - Essential Chiller Unit Area Temperature	~~R/B~~ PS/B	9	Other	2wks	Mild	Mild	No (1)	E	I	
51	VRS-TS-2729A	A - Essential Chiller Unit Area Temperature	~~R/B~~ PS/B	9	Other	2wks	Mild	Mild	No (1)	E	I	
52	VRS-TS-2725B	B - Essential Chiller Unit Area Temperature	~~R/B~~ PS/B	9	Other	2wks	Mild	Mild	No (1)	E	I	
53	VRS-TS-2728B	B - Essential Chiller Unit Area Temperature	~~R/B~~ PS/B	9	Other	2wks	Mild	Mild	No (1)	E	I	
54	VRS-TS-2729B	B - Essential Chiller Unit Area Temperature	~~R/B~~ PS/B	9	Other	2wks	Mild	Mild	No (1)	E	I	
55	VRS-TS-2725C	C - Essential Chiller Unit Area Temperature	~~R/B~~ PS/B	9	Other	2wks	Mild	Mild	No (1)	E	I	
56	VRS-TS-2728C	C - Essential Chiller Unit Area Temperature	~~R/B~~ PS/B	9	Other	2wks	Mild	Mild	No (1)	E	I	
57	VRS-TS-2729C	C - Essential Chiller Unit Area Temperature	~~R/B~~ PS/B	9	Other	2wks	Mild	Mild	No (1)	E	I	
58	VRS-TS-2725D	D - Essential Chiller Unit Area Temperature	~~R/B~~ PS/B	9	Other	2wks	Mild	Mild	No (1)	E	I	
59	VRS-TS-2728D	D - Essential Chiller Unit Area Temperature	~~R/B~~ PS/B	9	Other	2wks	Mild	Mild	No (1)	E	I	
60	VRS-TS-2729D	D - Essential Chiller Unit Area Temperature	~~R/B~~ PS/B	9	Other	2wks	Mild	Mild	No (1)	E	I	
61	VRS-TS-2730	A - Charging Pump Area Temperature	R/B	7	Other	~~2wks~~1yr	Mild	Harsh	No (1)	E	I	
62	VRS-TS-2733	A - Charging Pump Area Temperature	R/B	7	Other	~~2wks~~1yr	Mild	Harsh	No (1)	E	I	

Table 3D-2 US-APWR Environmental Qualification Equipment List
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Item Num	Equipment Tag	Description	Location (~~PCCV, R/B, A/B, O/B,T/B, UHSRS~~)		Purpose	Operational Duration	Environmental Conditions	Radiation Condition	Influence of Submergence for Total Integrated Dose	Qualification Process	Seismic Category	Comments
			Building	Zone	RT, ESF, PAM, Paressure Boundary (PB), Other		Harsh or Mild	Harsh or Mild	Yes/No	E=Electrical M=Mechanical	I, II, Non	
63	VRS-TS-2734	A - Charging Pump Area Temperature	R/B	7	Other	~~2wks~~1yr	Mild	Harsh	No (1)	E	I	
64	VRS-TS-2735	B - Charging Pump Area Temperature	R/B	7	Other	~~2wks~~1yr	Mild	Harsh	No (1)	E	I	
65	VRS-TS-2738	B - Charging Pump Area Temperature	R/B	7	Other	~~2wks~~1yr	Mild	Harsh	No (1)	E	I	
66	VRS-TS-2739	B - Charging Pump Area Temperature	R/B	7	Other	~~2wks~~1yr	Mild	Harsh	No (1)	E	I	
67	VRS-TS-2740	A - Annulus Emergency Exhaust Filtration Unit Area Temperature	R/B	7	Other	1yr	Mild	Harsh	No (1)	E	I	
68	VRS-TS-2743	A - Annulus Emergency Exhaust Filtration Unit Area Temperature	R/B	7	Other	1yr	Mild	Harsh	No (1)	E	I	
69	VRS-TS-2744	A - Annulus Emergency Exhaust Filtration Unit Area Temperature	R/B	7	Other	1yr	Mild	Harsh	No (1)	E	I	
70	VRS-TS-2745	B - Annulus Emergency Exhaust Filtration Unit Area Temperature	R/B	7	Other	1yr	Mild	Harsh	No (1)	E	I	
71	VRS-TS-2748	B - Annulus Emergency Exhaust Filtration Unit Area Temperature	R/B	7	Other	1yr	Mild	Harsh	No (1)	E	I	
72	VRS-TS-2749	B - Annulus Emergency Exhaust Filtration Unit Area Temperature	R/B	7	Other	1yr	Mild	Harsh	No (1)	E	I	
73	VRS-TS-2787	A - Class 1E Electrical Room Temperature	R/B	4	Other	2wks	Mild	Mild	No (1)	E	I	
74	VRS-TS-2797	B - Class 1E Electrical Room Temperature	R/B	4	Other	2wks	Mild	Mild	No (1)	E	I	
75	VRS-TS-2807	C - Class 1E Electrical Room Temperature	R/B	4	Other	2wks	Mild	Mild	No (1)	E	I	
76	VRS-TS-2817	D - Class 1E Electrical Room Temperature	R/B	4	Other	2wks	Mild	Mild	No (1)	E	I	
77	VRS-TS-2849	Main Control Room Temperature	R/B	2	Other	2wks	Mild	Mild	No (1)	E	I	
78	VRS-TS-2859	Main Control Room Temperature	R/B	2	Other	2wks	Mild	Mild	No (1)	E	I	
79	VRS-TS-2869	Main Control Room Temperature	R/B	2	Other	2wks	Mild	Mild	No (1)	E	I	
80	VRS-TS-2879	Main Control Room Temperature	R/B	2	Other	2wks	Mild	Mild	No (1)	E	I	

Table 3D-2 US-APWR Environmental Qualification Equipment List
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Item Num	Equipment Tag	Description	Location (~~PCCV, R/B, A/B, O/B,T/B, UHSRS~~)		Purpose	Operational Duration	Environmental Conditions	Radiation Condition	Influence of Submergence for Total Integrated Dose	Qualification Process	Seismic Category	Comments
			Building	Zone	RT, ESF, PAM, Paressure Boundary (PB), Other		Harsh or Mild	Harsh or Mild	Yes/No	E=Electrical M=Mechanical	I, II, Non	
Cables												
1	N/A	Optical Cable	R/B	8	RT,ESF,PAM	1yr	Mild	Harsh	No (1)	E	I	
2	N/A	Instrumentation Cable (Harsh Specification)	PCCV, R/B	1-4 6	RT,ESF,PAM	1yr	Harsh	Harsh	No (1)	E	I	
3	N/A	Instrumentation Cable (Mild Specification)	R/B	7	RT,ESF,PAM	1yr	Mild	Harsh	No (1)	E	I	
4	N/A	Control Cable (Harsh Specification)	PCCV, R/B	1-4 6	ESF,PAM	1yr	Harsh	Harsh	No (1)	E	I	
5	N/A	Control Cable (Mild Specification)	R/B	7	RT,ESF,PAM	1yr	Mild	Harsh	No (1)	E	I	
6	N/A	Medium Voltage Power Cable (Harsh Specification)	PCCV, R/B	6	ESF	30min	Harsh	Harsh	No (1)	E	I	
7	N/A	Medium Voltage Power Cable (Mild Specification)	R/B	7	ESF	30min	Mild	Harsh	No (1)	E	I	
8	N/A	Low Voltage Power Cable (Harsh Specification)	PCCV, R/B	1-4 6	ESF	30min	Harsh	Harsh	No (1)	E	I	
9	N/A	Low Voltage Power Cable (Mild Specification)	R/B	7	ESF	30min	Mild	Harsh	No (1)	E	I	
10	N/A	Other Specific Cables	PCCV, R/B	1-4 6	RT,ESF,PAM	1yr	Harsh	Harsh	No (1)	E	I	
11	N/A	Other Specific Cables	R/B	7	RT,ESF,PAM	1yr	Mild	Harsh	No (1)	E	I	
Electrical Component												
1	A-EGTG	A-Class 1E Gas Turbine Generator	PS/B	11	ESF	2wks	Mild	Mild	No (1)	E	I	
2	B-EGTG	B-Class 1E Gas Turbine Generator	PS/B	11	ESF	2wks	Mild	Mild	No (1)	E	I	
3	C-EGTG	C-Class 1E Gas Turbine Generator	PS/B	11	ESF	2wks	Mild	Mild	No (1)	E	I	
4	D-EGTG	D-Class 1E Gas Turbine Generator	PS/B	11	ESF	2wks	Mild	Mild	No (1)	E	I	
5		Containment Electrical Penetration	PCCV	1-5	RT, ESF, PAM, PB	1yr	Harsh	Harsh	No (1)	E, M	I	
6		Raceway(Tray, Conduit)	PCCV, R/B, PS/B	1-4 6 7	RT, ESF, PAM	1yr	Harsh/Mild	Harsh	No (1)	M	I	

Table 3D-2 US-APWR Environmental Qualification Equipment List
(Sheet 21 of 64)

Item Num	Equipment Tag	Description	Location (~~PCCV, R/B, A/B, O/B,T/B, UHSRS~~)		Purpose	Operational Duration	Environmental Conditions	Radiation Condition	Influence of Submergence for Total Integrated Dose	Qualification Process	Seismic Category	Comments
			Building	Zone	RT, ESF, PAM, Paressure Boundary (PB), Other		Harsh or Mild	Harsh or Mild	Yes/No	E=Electrical M=Mechanical	I, II, Non	
Electrical Cabinet												
1	OC	Operator Console	R/B	2	RT, ESF, PAM	2wks	Mild	Mild	No (1)	E	I	
2	RPS-A	A-Reactor Protection System Cabinet	R/B	3	RT, ESF, PAM	2wks	Mild	Mild	No (1)	E	I	
3	EFS-A	A-ESF Actuation System Cabinet	R/B	3	ESF	2wks	Mild	Mild	No (1)	E	I	
4	SVP-A	A-Safety VDU Processor Cabinet	R/B	3	RT, ESF, PAM	2wks	Mild	Mild	No (1)	E	I	
5	SLS-A	A-Safety Logic System Cabinet	R/B	3	ESF, PAM	2wks	Mild	Mild	No (1)	E	I	
6	RPS-B	B-Reactor Protection System Cabinet	R/B	3	RT, ESF, PAM	2wks	Mild	Mild	No (1)	E	I	
7	EFS-B	B-ESF Actuation System Cabinet	R/B	3	ESF	2wks	Mild	Mild	No (1)	E	I	
8	SVP-B	B-Safety VDU Processor Cabinet	R/B	3	RT, ESF, PAM	2wks	Mild	Mild	No (1)	E	I	
9	SLS-B	B-Safety Logic System Cabinet	R/B	3	ESF, PAM	2wks	Mild	Mild	No (1)	E	I	
10	RPS-C	C-Reactor Protection System Cabinet	R/B	3	RT, ESF, PAM	2wks	Mild	Mild	No (1)	E	I	
11	EFS-C	C-ESF Actuation System Cabinet	R/B	3	ESF	2wks	Mild	Mild	No (1)	E	I	
12	SVP-C	C-Safety VDU Processor Cabinet	R/B	3	RT, ESF, PAM	2wks	Mild	Mild	No (1)	E	I	
13	SLS-C	C-Safety Logic System Cabinet	R/B	3	ESF, PAM	2wks	Mild	Mild	No (1)	E	I	
14	RPS-D	D-Reactor Protection System Cabinet	R/B	3	RT, ESF, PAM	2wks	Mild	Mild	No (1)	E	I	
15	EFS-D	D-ESF Actuation System Cabinet	R/B	3	ESF	2wks	Mild	Mild	No (1)	E	I	
16	SVP-D	D-Safety VDU Processor Cabinet	R/B	3	RT, ESF, PAM	2wks	Mild	Mild	No (1)	E	I	
17	SLS-D	D-Safety Logic System Cabinet	R/B	3	ESF, PAM	2wks	Mild	Mild	No (1)	E	I	

Attachment 1
to RAI 358-2462

Table 3D-2 US-APWR Environmental Qualification Equipment List
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Item Num	Equipment Tag	Description	Location (~~PCCV, R/B, A/B, O/B,T/B, UHSRS~~)		Purpose	Operational Duration	Environmental Conditions	Radiation Condition	Influence of Submergence for Total Integrated Dose	Qualification Process	Seismic Category	Comments
			Building	Zone	RT, ESF, PAM, Paressure Boundary (PB), Other		Harsh or Mild	Harsh or Mild	Yes/No	E=Electrical M=Mechanical	I, II, Non	
18	MC-A	A-Class 1E 6.9kV Switchgear	R/B	4	ESF	2wks	Mild	Mild	No (1)	E	I	
19	LC-A	A-Class 1E 480V Load Center	R/B	4	ESF	2wks	Mild	Mild	No (1)	E	I	
20	MCC-A	A-Class 1E Motor Control Center	R/B	4	ESF	2wks	Mild	Mild	No (1)	E	I	
21	MCC-A1	A1-Class 1E Motor Control Center	R/B	4	ESF	2wks	Mild	Mild	No (1)	E	I	
22	RIO-A	A-Safety Remote I/O Cabinet	R/B	4	ESF, PAM	2wks	Mild	Mild	No (1)	E	I	
23	PBH-A	A-Pressurizer Heater Distribution Panel	R/B	4	ESF	2wks	Mild	Mild	No (1)	E	I	
24	RPTS-A	A-RCP Trip Switchgear	R/B	4	Other	2wks	Mild	Mild	No (1)	E	I	
25	MC-B	B-Class 1E 6.9kV Switchgear	R/B	4	ESF	2wks	Mild	Mild	No (1)	E	I	
26	LC-B	B-Class 1E 480V Load Center	R/B	4	ESF	2wks	Mild	Mild	No (1)	E	I	
27	MCC-B	B-Class 1E Motor Control Center	R/B	4	ESF	2wks	Mild	Mild	No (1)	E	I	
28	RIO-B	B-Safety Remote I/O Cabinet	R/B	3	ESF, PAM	2wks	Mild	Mild	No (1)	E	I	
29	PBH-B	B-Pressurizer Heater Distribution Panel	R/B	4	ESF	2wks	Mild	Mild	No (1)	E	I	
30	RPTS-B	B-RCP Trip Switchgear	R/B	4	Other	2wks	Mild	Mild	No (1)	E	I	
31	MC-C	C-Class 1E 6.9kV Switchgear	R/B	4	ESF	2wks	Mild	Mild	No (1)	E	I	
32	LC-C	C-Class 1E 480V Load Center	R/B	4	ESF	2wks	Mild	Mild	No (1)	E	I	
33	MCC-C	C-Class 1E Motor Control Center	R/B	4	ESF	2wks	Mild	Mild	No (1)	E	I	
34	RIO-C	C-Safety Remote I/O Cabinet	R/B	3	ESF, PAM	2wks	Mild	Mild	No (1)	E	I	
35	PBH-C	C-Pressurizer Heater Distribution Panel	R/B	4	ESF	2wks	Mild	Mild	No (1)	E	I	

Table 3D-2 US-APWR Environmental Qualification Equipment List
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Item Num	Equipment Tag	Description	Location (~~PCCV, R/B, A/B, O/B,T/B, UHSRS~~)		Purpose	Operational Duration	Environmental Conditions	Radiation Condition	Influence of Submergence for Total Integrated Dose	Qualification Process	Seismic Category	Comments
			Building	Zone	RT, ESF, PAM, Paressure Boundary (PB), Other		Harsh or Mild	Harsh or Mild	Yes/No	E=Electrical M=Mechanical	I, II, Non	
36	RPTS-C	C-RCP Trip Switchgear	R/B	4	Other	2wks	Mild	Mild	No (1)	E	I	
37	MC-D	D-Class 1E 6.9kV Switchgear	R/B	4	ESF	2wks	Mild	Mild	No (1)	E	I	
38	LC-D	D-Class 1E 480V Load Center	R/B	4	ESF	2wks	Mild	Mild	No (1)	E	I	
39	MCC-D	D-Class 1E Motor Control Center	R/B	4	ESF	2wks	Mild	Mild	No (1)	E	I	
40	MCC-D1	D1-Class 1E Motor Control Center	R/B	4	ESF	2wks	Mild	Mild	No (1)	E	I	
41	RIO-D	D-Safety Remote I/O Cabinet	R/B	4	ESF, PAM	2wks	Mild	Mild	No (1)	E	I	
42	PBH-D	D-Pressurizer Heater Distribution Panel	R/B	4	ESF	2wks	Mild	Mild	No (1)	E	I	
43	RPTS-D	D-RCP Trip Switchgear	R/B	4	Other	2wks	Mild	Mild	No (1)	E	I	
44	RSC	Remote Shutdown Console	R/B	2	RT, ESF, PAM	2wks	Mild	Mild	No (1)	E	I	
45	MRTP-1	MCR/RSR Transfer Panel (1)	R/B	14	RT, ESF, PAM	2wks	Mild	Mild	No (1)	E	I	
46	MRTP-2	MCR/RSR Transfer Panel (2)	R/B	2	RT, ESF, PAM	2wks	Mild	Mild	No (1)	E	I	
47	RTBC-1	Reactor Trip Breaker Cabinet (1)	R/B	4	RT	5min	Mild	Mild	No (1)	E	I	
48	RTBC-2	Reactor Trip Breaker Cabinet (2)	R/B	4	RT	5min	Mild	Mild	No (1)	E	I	
49	BCP-A	A-Class 1E Battery Charger	PS/B	4	RT, ESF	2wks	Mild	Mild	No (1)	E	I	
50A	DCC-A	A-Class 1E DC Switchboard	PS/B	4	RT, ESF	2wks	Mild	Mild	No (1)	E	I	
50B	DCC-A1	A1-Class 1E DC Switchboard	PS/B	4	RT, ESF	2wks	Mild	Mild	No (1)	E	I	
51	DDP-A	A-Reactor Building DC Distribution Panel	R/B	4	RT, ESF	2wks	Mild	Mild	No (1)	E	I	
52	SDC-A	A-Solenoid Distribution Panel	R/B	4	ESF	2wks	Mild	Mild	No (1)	E	I	

Table 3D-2 US-APWR Environmental Qualification Equipment List
(Sheet 24 of 64)

Item Num	Equipment Tag	Description	Location (~~PCCV, R/B, A/B, O/B,T/B, UHSRS~~)		Purpose	Operational Duration	Environmental Conditions	Radiation Condition	Influence of Submergence for Total Integrated Dose	Qualification Process	Seismic Category	Comments
			Building	Zone	RT, ESF, PAM, Paressure Boundary (PB), Other		Harsh or Mild	Harsh or Mild	Yes/No	E=Electrical M=Mechanical	I, II, Non	
53	IBC-A	A-Class 1E UPS Unit	R/B	4	RT, ESF, PAM	2wks	Mild	Mild	No (1)	E	I	
54	IBB-A	A-Class 1EI&C Power Transformer	R/B	4	RT, ESF, PAM	2wks	Mild	Mild	No (1)	E	I	
55	IBD-A	A-Class 1E AC120V Panelboard	R/B	4	RT, ESF, PAM	2wks	Mild	Mild	No (1)	E	I	
56	MVIA1	A-MOV Inverter1	R/B	4	ESF, PB	2wks	Mild	Mild	No (1)	E	I	
57	MVIA2	A-MOV Inverter2	R/B	4	ESF, PB	2wks	Mild	Mild	No (1)	E	I	
58	MVCA1	A-MOV Motor Control Center1	R/B	4	ESF, PB	2wks	Mild	Mild	No (1)	E	I	
59	MVCA2	A-MOV Motor Control Center2	R/B	4	ESF, PB	2wks	Mild	Mild	No (1)	E	I	
60	BCP-B	B-Class 1E Battery Charger	PS/B	4	RT, ESF	2wks	Mild	Mild	No (1)	E	I	
61	DCC-B	B-Class 1E DC Switchboard	PS/B	4	RT, ESF	2wks	Mild	Mild	No (1)	E	I	
62	DDP-B	B-Reactor Building DC Distribution Panel	R/B	4	RT, ESF	2wks	Mild	Mild	No (1)	E	I	
63	SDC-B	B-Solenoid Distribution Panel	R/B	4	ESF	2wks	Mild	Mild	No (1)	E	I	
64	IBC-B	B-Class 1E UPS Unit	R/B	4	RT, ESF, PAM	2wks	Mild	Mild	No (1)	E	I	
65	IBB-B	B-Class 1E I&C Power Transformer	R/B	4	RT, ESF, PAM	2wks	Mild	Mild	No (1)	E	I	
66	IBD-B	B-Class 1E AC120V Panelboard	R/B	4	RT, ESF, PAM	2wks	Mild	Mild	No (1)	E	I	
67	MVIB	B-MOV Inverter	R/B	4	ESF, PB	2wks	Mild	Mild	No (1)	E	I	
68	MVCB	B-MOV Motor Control Center	R/B	4	ESF, PB	2wks	Mild	Mild	No (1)	E	I	
69	BCP-C	C-Class 1E Battery Charger	PS/B	4	RT, ESF	2wks	Mild	Mild	No (1)	E	I	
70	DCC-C	C-Class 1E DC Switchboard	PS/B	4	RT, ESF	2wks	Mild	Mild	No (1)	E	I	
71	DDP-C	C-Reactor Building DC Distribution Panel	R/B	4	RT, ESF	2wks	Mild	Mild	No (1)	E	I	

Table 3D-2 US-APWR Environmental Qualification Equipment List
(Sheet 25 of 64)

Item Num	Equipment Tag	Description	Location (~~PCCV, R/B, A/B, O/B,T/B, UHSRS~~)		Purpose	Operational Duration	Environmental Conditions	Radiation Condition	Influence of Submergence for Total Integrated Dose	Qualification Process	Seismic Category	Comments
			Building	Zone	RT, ESF, PAM, Paressure Boundary (PB), Other		Harsh or Mild	Harsh or Mild	Yes/No	E=Electrical M=Mechanical	I, II, Non	
72	SDC-C	C-Solenoid Distribution Panel	R/B	4	ESF	2wks	Mild	Mild	No (1)	E	I	
73	IBC-C	C-Class 1E UPS Unit	R/B	4	RT, ESF, PAM	2wks	Mild	Mild	No (1)	E	I	
74	IBB-C	C-I&C Power Transformer	R/B	4	RT, ESF, PAM	2wks	Mild	Mild	No (1)	E	I	
75	IBD-C	C-Class 1E AC120V Panelboard	R/B	4	RT, ESF, PAM	2wks	Mild	Mild	No (1)	E	I	
76	MVIC	C-MOV Inverter	R/B	4	ESF, PB	2wks	Mild	Mild	No (1)	E	I	
77	MVCC	C-MOV Motor Control Center	R/B	4	ESF, PB	2wks	Mild	Mild	No (1)	E	I	
78	BCP-D	D-Class 1E Battery Charger	PS/B	4	RT, ESF	2wks	Mild	Mild	No (1)	E	I	
79A	DCC-D	D-Class 1E DC Switchboard	PS/B	4	RT, ESF	2wks	Mild	Mild	No (1)	E	I	
79B	DCC-D1	D1-Class 1E DC Switchboard	PS/B	4	RT, ESF	2wks	Mild	Mild	No (1)	E	I	
80	DDP-D	D-Reactor Building DC Distribution Panel	R/B	4	RT, ESF	2wks	Mild	Mild	No (1)	E	I	
81	SDC-D	D-Solenoid Distribution Panel	R/B	4	ESF	2wks	Mild	Mild	No (1)	E	I	
82	IBC-D	D-Class 1E UPS Unit	R/B	4	RT, ESF, PAM	2wks	Mild	Mild	No (1)	E	I	
83	IBB-D	D-Class 1EI&C Power Transformer	R/B	4	RT, ESF, PAM	2wks	Mild	Mild	No (1)	E	I	
84	IBD-D	D-Class 1E AC120V Panelboard	R/B	4	RT, ESF, PAM	2wks	Mild	Mild	No (1)	E	I	
85	MVID1	D-MOV Inverter1	R/B	4	ESF, PB	2wks	Mild	Mild	No (1)	E	I	
86	MVID2	D-MOV Inverter2	R/B	4	ESF, PB	2wks	Mild	Mild	No (1)	E	I	
87	MVCD1	D-MOV Motor Control Center1	R/B	4	ESF, PB	2wks	Mild	Mild	No (1)	E	I	
88	MVCD2	D-MOV Motor Control Center2	R/B	4	ESF, PB	2wks	Mild	Mild	No (1)	E	I	
89	VCC-A	A-Ventilation Chiller Control Cabinet	PS/B	9	ESF	2wks	Mild	Mild	No (1)	E	I	
90	VCC-B	B-Ventilation Chiller Control Cabinet	PS/B	9	ESF	2wks	Mild	Mild	No (1)	E	I	
91	VCC-C	C-Ventilation Chiller Control Cabinet	PS/B	9	ESF	2wks	Mild	Mild	No (1)	E	I	
92	VCC-D	D-Ventilation Chiller Control Cabinet	PS/B	9	ESF	2wks	Mild	Mild	No (1)	E	I	
93	BAT-A	A-Class 1E Battery	PS/B	5	RT, ESF	2hr	Mild	Mild	No (1)	E	I	

Table 3D-2 US-APWR Environmental Qualification Equipment List
(Sheet 26 of 64)

Item Num	Equipment Tag	Description	Location (~~PCCV, R/B, A/B, O/B,T/B, UHSRS~~)		Purpose	Operational Duration	Environmental Conditions	Radiation Condition	Influence of Submergence for Total Integrated Dose	Qualification Process	Seismic Category	Comments
			Building	Zone	RT, ESF, PAM, Paressure Boundary (PB), Other		Harsh or Mild	Harsh or Mild	Yes/No	E=Electrical M=Mechanical	I, II, Non	
94	BAT-B	B-Class 1E Battery	PS/B	5	RT, ESF	2hr	Mild	Mild	No (1)	E	I	
95	BAT-C	C-Class 1E Battery	PS/B	5	RT, ESF	2hr	Mild	Mild	No (1)	E	I	
96	BAT-D	D-Class 1E Battery	PS/B	5	RT, ESF	2hr	Mild	Mild	No (1)	E	I	
97	EPBA	A-Class 1E Gas Turbine Generator Control Board	PS/B	11	ESF	2wks	Mild	Mild	No (1)	E	I	
98	EPBB	B-Class 1E Gas Turbine Generator Control Board	PS/B	11	ESF	2wks	Mild	Mild	No (1)	E	I	
99	EPBC	C-Class 1E Gas Turbine Generator Control Board	PS/B	11	ESF	2wks	Mild	Mild	No (1)	E	I	
100	EPBD	D-Class 1E Gas Turbine Generator Control Board	PS/B	11	ESF	2wks	Mild	Mild	No (1)	E	I	
101	TTSD-A	A-Turbine Trip Solenoid Distribution Panel	R/B	4	Other	2wks	Mild	Mild	No (1)	E	I	
102	TTSD-B	B-Turbine Trip Solenoid Distribution Panel	R/B	4	Other	2wks	Mild	Mild	No (1)	E	I	
103	TTSD-C	C-Turbine Trip Solenoid Distribution Panel	R/B	4	Other	2wks	Mild	Mild	No (1)	E	I	
104	TTSD-D	D-Turbine Trip Solenoid Distribution Panel	R/B	4	Other	2wks	Mild	Mild	No (1)	E	I	
105	SRPP-A	Source Range Neutron Flux Preamplifier Panel (Train A)	R/B	6	RT, Other	36hr	Mild	Harsh	No (1)	E	I	
106	SRPP-D	Source Range Neutron Flux Preamplifier Panel (Train D)	R/B	6	RT, Other	36hr	Mild	Harsh	No (1)	E	I	
107	WRPP-A	Wide Range Neutron Flux Preamplifier Panel (Train A)	R/B	6	PAM	~~1yr~~ ~~4mos~~	Mild	Harsh	No (1)	E	I	
108	WRPP-D	Wide Range Neutron Flux Preamplifier Panel (Train D)	R/B	6	PAM	~~1yr~~ ~~4mos~~	Mild	Harsh	No (1)	E	I	
Equipment (Rector Coolant System)												
1	RCS-CTK-001	Reactor Vessel	PCCV	1-1	PB	1yr	Harsh	Harsh	Yes	M	I	
2	RCS-CHX-001A	A-Steam Generator	PCCV	1-4	PB	1yr	Harsh	Harsh	No (1)	M	I	
3	RCS-CHX-001B	B-Steam Generator	PCCV	1-4	PB	1yr	Harsh	Harsh	No (1)	M	I	
4	RCS-CHX-001C	C-Steam Generator	PCCV	1-4	PB	1yr	Harsh	Harsh	No (1)	M	I	

Table 3D-2 US-APWR Environmental Qualification Equipment List
(Sheet 27 of 64)

Item Num	Equipment Tag	Description	Location (~~PCCV, R/B, A/B, O/B,T/B, UHSRS~~)		Purpose	Operational Duration	Environmental Conditions	Radiation Condition	Influence of Submergence for Total Integrated Dose	Qualification Process	Seismic Category	Comments
			Building	Zone	RT, ESF, PAM, Paressure Boundary (PB), Other		Harsh or Mild	Harsh or Mild	Yes/No	E=Electrical M=Mechanical	I, II, Non	
5	RCS-CHX-001D	D-Steam Generator	PCCV	1-4	PB	1yr	Harsh	Harsh	No (1)	M	I	
6	RCS-CTK-002	Pressurizer	PCCV	1-4	PB	1yr	Harsh	Harsh	No (1)	M	I	
7	RCS-CPP-001A	A-Reactor Coolant Pump	PCCV	1-4	PB	1yr	Harsh	Harsh	No (1)	M	I	
8	RCS-CPP-001B	B-Reactor Coolant Pump	PCCV	1-4	PB	1yr	Harsh	Harsh	No (1)	M	I	
9	RCS-CPP-001C	C-Reactor Coolant Pump	PCCV	1-4	PB	1yr	Harsh	Harsh	No (1)	M	I	
10	RCS-CPP-001D	D-Reactor Coolant Pump	PCCV	1-4	PB	1yr	Harsh	Harsh	No (1)	M	I	
11	RCS-VLV-120	A-Pressurizer Safety Valve	PCCV	1-4	ESF	5min	Harsh	Harsh	No (1)	M	I	
12	RCS-VLV-121	B-Pressurizer Safety Valve	PCCV	1-4	ESF	5min	Harsh	Harsh	No (1)	M	I	
13	RCS-VLV-122	C-Pressurizer Safety Valve	PCCV	1-4	ESF	5min	Harsh	Harsh	No (1)	M	I	
14	RCS-VLV-123	D-Pressurizer Safety Valve	PCCV	1-4	ESF	5min	Harsh	Harsh	No (1)	M	I	
15	RCS-MOV-002A	Motor Operated Valve	PCCV	1-6	ESF	1yr	Harsh	Harsh	No (1)	M	I	
16	RCS-MOV-002B	Motor Operated Valve	PCCV	1-6	ESF	1yr	Harsh	Harsh	No (1)	M	I	
17	RCS-MOV-003A	Motor Operated Valve	PCCV	1-6	ESF	1yr	Harsh	Harsh	No (1)	M	I	
18	RCS-MOV-003B	Motor Operated Valve	PCCV	1-6	ESF	1yr	Harsh	Harsh	No (1)	M	I	
19	RCS-MOV-111A	Motor Operated Valve	PCCV	1-5	ESF	1yr	Harsh	Harsh	No (1)	M	I	
20	RCS-MOV-111B	Motor Operated Valve	PCCV	1-5	ESF	1yr	Harsh	Harsh	No (1)	M	I	
21	RCS-MOV-116A	Motor Operated Valve	PCCV	1-4	ESF	1yr	Harsh	Harsh	No (1)	M	I	
22	RCS-MOV-116B	Motor Operated Valve	PCCV	1-4	ESF	1yr	Harsh	Harsh	No (1)	M	I	
23	RCS-MOV-117A	A-Safety Depressurization Valve	PCCV	1-4	ESF	1yr	Harsh	Harsh	No (1)	M	I	
24	RCS-MOV-117B	B-Safety Depressurization Valve	PCCV	1-4	ESF	1yr	Harsh	Harsh	No (1)	M	I	
25	RCS-MOV-118	Motor Operated Valve	PCCV	1-4	ESF	1yr	Harsh	Harsh	No (1)	M	I	
26	RCS-MOV-119	Depressurization Valve	PCCV	1-4	ESF	1yr	Harsh	Harsh	No (1)	M	I	
27	RCS-AOV-132	Air Operated Valve	R/B	6	ESF	5min	Mild	Harsh	No (1)	M	I	
28	RCS-PCV-451A	A-Pressurizer Spray Valve	PCCV	1-5	PB	1yr	Harsh	Harsh	No (1)	M	I	
29	RCS-PCV-451B	B-Pressurizer Spray Valve	PCCV	1-5	PB	1yr	Harsh	Harsh	No (1)	M	I	

Table 3D-2 US-APWR Environmental Qualification Equipment List
(Sheet 28 of 64)

Item Num	Equipment Tag	Description	Location (~~PCCV, R/B, A/B, O/B,T/B, UHSRS~~)		Purpose	Operational Duration	Environmental Conditions	Radiation Condition	Influence of Submergence for Total Integrated Dose	Qualification Process	Seismic Category	Comments
			Building	Zone	RT, ESF, PAM, Paressure Boundary (PB), Other		Harsh or Mild	Harsh or Mild	Yes/No	E=Electrical M=Mechanical	I, II, Non	
30	RCS-AOV-147	Air Operated Valve	PCCV	1-5	ESF	5min	Harsh	Harsh	No (1)	M	I	
31	RCS-AOV-148	Air Operated Valve	R/B	6	ESF	5min	Mild	Harsh	No (1)	M	I	
32	RCS-AOV-138	Air Operated Valve	R/B	6	ESF	5min	Mild	Harsh	No (1)	M	I	
Equipment (Chemical and Volume Control System)												
1	CVS-RPP-001A	A-Charging Pump	R/B	7	ESF	2wks	Mild	Harsh	No (2)	M	I	
2	CVS-RPP-001B	B-Charging Pump	R/B	7	ESF	2wks	Mild	Harsh	No (2)	M	I	
3	CVS-MOV-151	Motor Operated Valve	R/B	7	ESF	5min	Mild	Harsh	No (1)	M	I	
4	CVS-MOV-152	Motor Operated Valve	R/B	7	ESF	5min	Mild	Harsh	No (1)	M	I	
5	CVS-MOV-203	Motor Operated Valve	PCCV	1-5	ESF	5min	Harsh	Harsh	No (1)	M	I	
6	CVS-MOV-204	Motor Operated Valve	R/B	6	ESF	5min	Mild	Harsh	No (1)	M	I	
7	CVS-MOV-178A	Motor Operated Valve	R/B	7	ESF	1yr	Mild	Harsh	No (1)	M	I	
8	CVS-MOV-178B	Motor Operated Valve	R/B	7	ESF	1yr	Mild	Harsh	No (1)	M	I	
9	CVS-AOV-005	Air Operated Valve	PCCV	1-5	ESF	1yr	Harsh	Harsh	No (1)	M	I	
10	CVS-AOV-006	Air Operated Valve	R/B	7	ESF	1yr	Mild	Harsh	No (1)	M	I	
11	CVS-AOV-146	Air Operated Valve	R/B	7	PB	1yr	Mild	Harsh	No (1)	M	I	
12	CVS-AOV-155	Air Operated Valve	PCCV	1-4	PB	1yr	Harsh	Harsh	No (1)	M	I	
13	CVS-AOV-159	Air Operated Valve	PCCV	1-4	PB	1yr	Harsh	Harsh	No (1)	M	I	
14	CVS-LCV-451	Level Control Valve	PCCV	1-4	PB	1yr	Harsh	Harsh	No (1)	M	I	
15	CVS-LCV-452	Level Control Valve	PCCV	1-4	PB	1yr	Harsh	Harsh	No (1)	M	I	
16	CVS-AOV-192A	Air Operated Valve	PCCV	1-4	PB	1yr	Harsh	Harsh	No (1)	M	I	
17	CVS-AOV-192B	Air Operated Valve	PCCV	1-4	PB	1yr	Harsh	Harsh	No (1)	M	I	
18	CVS-AOV-221	Air Operated Valve	PCCV	1-4	PB	1yr	Harsh	Harsh	No (1)	M	I	
19	CVS-AOV-222	Air Operated Valve	PCCV	1-4	PB	1yr	Harsh	Harsh	No (1)	M	I	
20	CVS-MOV-178C	Motor Operated Valve	R/B	7	ESF	5min	Mild	Harsh	No (1)	M	I	
21	CVS-MOV-178D	Motor Operated Valve	R/B	7	ESF	5min	Mild	Harsh	No (1)	M	I	

Table 3D-2 US-APWR Environmental Qualification Equipment List
(Sheet 29 of 64)

Item Num	Equipment Tag	Description	Location (~~PCCV, R/B, A/B, O/B,T/B, UHSRS~~)		Purpose	Operational Duration	Environmental Conditions	Radiation Condition	Influence of Submergence for Total Integrated Dose	Qualification Process	Seismic Category	Comments
			Building	Zone	RT, ESF, PAM, Paressure Boundary (PB), Other		Harsh or Mild	Harsh or Mild	Yes/No	E=Electrical M=Mechanical	I, II, Non	
22	CVS-AOV-192C	Air Operated Valve	PCCV	1-4	PB	1yr	Harsh	Harsh	No (1)	M	I	
23	CVS-AOV-192D	Air Operated Valve	PCCV	1-4	PB	1yr	Harsh	Harsh	No (1)	M	I	
24	CVS-LCV-121B	Level Control Valve	R/B	7	Other	2wks	Mild	Harsh	No (1)	M	I	
25	CVS-LCV-121C	Level Control Valve	R/B	7	Other	2wks	Mild	Harsh	No (1)	M	I	
26	CVS-LCV-121D	Level Control Valve	R/B	7	Other	2wks	Mild	Harsh	No (1)	M	I	
27	CVS-LCV-121E	Level Control Valve	R/B	7	Other	2wks	Mild	Harsh	No (1)	M	I	
28	CVS-AOV-165	Air Operated Valve	R/B	7	Other	2wks	Mild	Harsh	No (1)	M	I	
29	CVS-FCV-138	Flow Control Valve	R/B	7	PB	2wks	Mild	Harsh	No (1)	M	I	
30	CVS-FCV-140	Flow Control Valve	R/B	7	Other	2wks	Mild	Harsh	No (1)	M	I	
31	CVS-FCV-218	Flow Control Valve	R/B	13-3	Other	2wks	Mild	Harsh	No (1)	M	I	
32	CVS-FCV-219	Flow Control Valve	R/B	13-3	Other	2wks	Mild	Harsh	No (1)	M	I	
33	CVS-VLV-002	Safety Valve	PCCV	1-4	ESF	1yr	Harsh	Harsh	No (1)	M	I	
34	CVS-VLV-201	Safety Valve	PCCV	1-5	ESF	1yr	Harsh	Harsh	No (1)	M	I	
35	CVS-AOV-001A	Air Operated Valve	PCCV	1-4	PB	1yr	Harsh	Harsh	No (1)	M	I	
36	CVS-AOV-001B	Air Operated Valve	PCCV	1-4	PB	1yr	Harsh	Harsh	No (1)	M	I	
37	CVS-AOV-001C	Air Operated Valve	PCCV	1-4	PB	1yr	Harsh	Harsh	No (1)	M	I	
38	CVS-HCV-102	Air Operated Valve	PCCV	1-5	PB	1yr	Harsh	Harsh	No (1)	M	I	
39	CVS-HCV-190	Air Operated Valve	PCCV	1-5	PB	1yr	Harsh	Harsh	No (1)	M	I	
40	CVS-AOV-224	Air Operated Valve	PCCV	1-5	PB	1yr	Harsh	Harsh	No (1)	M	I	
41	CVS-LCV-121F	Air Operated Valve	R/B	7	Other	2 wks	Mild	Harsh	No (1)	M	I	
42	CVS-LCV-121G	Air Operated Valve	R/B	7	Other	2wks	Mild	Harsh	No (1)	M	I	
43	CVS-AOV-196A	Air Operated Valve	PCCV	1-4	PB	1yr	Harsh	Harsh	No (1)	M	I	
44	CVS-AOV-196B	Air Operated Valve	PCCV	1-4	PB	1yr	Harsh	Harsh	No (1)	M	I	
45	CVS-AOV-196C	Air Operated Valve	PCCV	1-4	PB	1yr	Harsh	Harsh	No (1)	M	I	
46	CVS-AOV-196D	Air Operated Valve	PCCV	1-4	PB	1yr	Harsh	Harsh	No (1)	M	I	

Attachment 1
to RAI 358-2462

Table 3D-2 US-APWR Environmental Qualification Equipment List
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Item Num	Equipment Tag	Description	Location (~~PCCV, R/B, A/B, O/B,T/B, UHSRS~~)		Purpose	Operational Duration	Environmental Conditions	Radiation Condition	Influence of Submergence for Total Integrated Dose	Qualification Process	Seismic Category	Comments
			Building	Zone	RT, ESF, PAM, Paressure Boundary (PB), Other		Harsh or Mild	Harsh or Mild	Yes/No	E=Electrical M=Mechanical	I, II, Non	
Equipment (Safety Injection System)												
1	SIS-RPP-001A	A-Safety Injection Pump	R/B	6	ESF	1yr	Mild	Harsh	No (1)	M	I	
2	SIS-RPP-001B	B-Safety Injection Pump	R/B	6	ESF	1yr	Mild	Harsh	No (1)	M	I	
3	SIS-RPP-001C	C-Safety Injection Pump	R/B	6	ESF	1yr	Mild	Harsh	No (1)	M	I	
4	SIS-RPP-001D	D-Safety Injection Pump	R/B	6	ESF	1yr	Mild	Harsh	No (1)	M	I	
5	SIS-CTK-001A	A-Accumulator	PCCV	1-5	ESF	1yr	Harsh	Harsh	No (1)	M	I	
6	SIS-CTK-001B	B-Accumulator	PCCV	1-5	ESF	1yr	Harsh	Harsh	No (1)	M	I	
7	SIS-CTK-001C	C-Accumulator	PCCV	1-5	ESF	1yr	Harsh	Harsh	No (1)	M	I	
8	SIS-CTK-001D	D-Accumulator	PCCV	1-5	ESF	1yr	Harsh	Harsh	No (1)	M	I	
9	SIS-MOV-001A	Motor Operated Valve	R/B	6	ESF	1yr	Harsh	Harsh	No (1)	M	I	
10	SIS-MOV-001B	Motor Operated Valve	R/B	6	ESF	1yr	Harsh	Harsh	No (1)	M	I	
11	SIS-MOV-009A	Motor Operated Valve	R/B	6	ESF	1yr	Mild	Harsh	No (1)	M	I	
12	SIS-MOV-009B	Motor Operated Valve	R/B	6	ESF	1yr	Mild	Harsh	No (1)	M	I	
13	SIS-MOV-011A	Motor Operated Valve	PCCV	1-5	ESF	1yr	Harsh	Harsh	No (1)	M	I	
14	SIS-MOV-011B	Motor Operated Valve	PCCV	1-5	ESF	1yr	Harsh	Harsh	No (1)	M	I	
15	SIS-MOV-014A	Motor Operated Valve	PCCV	1-5	ESF	1yr	Harsh	Harsh	No (1)	M	I	
16	SIS-MOV-014B	Motor Operated Valve	PCCV	1-5	ESF	1yr	Harsh	Harsh	No (1)	M	I	
17	SIS-MOV-031B	Motor Operated Valve	PCCV	1-4	ESF	1yr	Harsh	Harsh	No (1)	M	I	
18	SIS-MOV-032B	Motor Operated Valve	PCCV	1-4	ESF	1yr	Harsh	Harsh	No (1)	M	I	
19	SIS-MOV-001C	Motor Operated Valve	R/B	6	ESF	1yr	Harsh	Harsh	No (1)	M	I	
20	SIS-MOV-001D	Motor Operated Valve	R/B	6	ESF	1yr	Harsh	Harsh	No (1)	M	I	
21	SIS-MOV-009C	Motor Operated Valve	R/B	6	ESF	1yr	Mild	Harsh	No (1)	M	I	
22	SIS-MOV-009D	Motor Operated Valve	R/B	6	ESF	1yr	Mild	Harsh	No (1)	M	I	
23	SIS-MOV-011C	Motor Operated Valve	PCCV	1-5	ESF	1yr	Harsh	Harsh	No (1)	M	I	
24	SIS-MOV-011D	Motor Operated Valve	PCCV	1-5	ESF	1yr	Harsh	Harsh	No (1)	M	I	

Table 3D-2 US-APWR Environmental Qualification Equipment List
(Sheet 31 of 64)

Item Num	Equipment Tag	Description	Location (~~PCCV, R/B, A/B, O/B,T/B, UHSRS~~)		Purpose	Operational Duration	Environmental Conditions	Radiation Condition	Influence of Submergence for Total Integrated Dose	Qualification Process	Seismic Category	Comments
			Building	Zone	RT, ESF, PAM, Paressure Boundary (PB), Other		Harsh or Mild	Harsh or Mild	Yes/No	E=Electrical M=Mechanical	I, II, Non	
25	SIS-MOV-014C	Motor Operated Valve	PCCV	1-5	ESF	1yr	Harsh	Harsh	No (1)	M	I	
26	SIS-MOV-014D	Motor Operated Valve	PCCV	1-5	ESF	1yr	Harsh	Harsh	No (1)	M	I	
27	SIS-MOV-024A	Motor Operated Valve	PCCV	1-5	ESF	1yr	Harsh	Harsh	No (1)	M	I	
28	SIS-MOV-024B	Motor Operated Valve	PCCV	1-5	ESF	1yr	Harsh	Harsh	No (1)	M	I	
29	SIS-MOV-024C	Motor Operated Valve	PCCV	1-5	ESF	1yr	Harsh	Harsh	No (1)	M	I	
30	SIS-MOV-024D	Motor Operated Valve	PCCV	1-5	ESF	1yr	Harsh	Harsh	No (1)	M	I	
31	SIS-MOV-031D	Motor Operated Valve	PCCV	1-4	ESF	1yr	Harsh	Harsh	No (1)	M	I	
32	SIS-MOV-032D	Motor Operated Valve	PCCV	1-4	ESF	1yr	Harsh	Harsh	No (1)	M	I	
33	SIS-MOV-121A	Motor Operated Valve	PCCV	1-5	ESF	1yr	Harsh	Harsh	No (1)	M	I	
34	SIS-MOV-121B	Motor Operated Valve	PCCV	1-5	ESF	1yr	Harsh	Harsh	No (1)	M	I	
35	SIS-MOV-125A	Motor Operated Valve	PCCV	1-5	ESF	1yr	Harsh	Harsh	No (1)	M	I	
36	SIS-MOV-125B	Motor Operated Valve	PCCV	1-5	ESF	1yr	Harsh	Harsh	No (1)	M	I	
37	SIS-MOV-125C	Motor Operated Valve	PCCV	1-5	ESF	1yr	Harsh	Harsh	No (1)	M	I	
38	SIS-MOV-125D	Motor Operated Valve	PCCV	1-5	ESF	1yr	Harsh	Harsh	No (1)	M	I	
39	SIS-MOV-101A	Motor Operated Valve	PCCV	1-5	ESF	1yr	Harsh	Harsh	No (1)	M	I	
40	SIS-MOV-101B	Motor Operated Valve	PCCV	1-5	ESF	1yr	Harsh	Harsh	No (1)	M	I	
41	SIS-MOV-101C	Motor Operated Valve	PCCV	1-5	ESF	1yr	Harsh	Harsh	No (1)	M	I	
42	SIS-MOV-101D	Motor Operated Valve	PCCV	1-5	ESF	1yr	Harsh	Harsh	No (1)	M	I	
43	SIS-VLV-116	Safety Valve	PCCV	1-5	ESF	1yr	Harsh	Harsh	No (1)	M	I	
44	SIS-VLV-126A	Safety Valve	PCCV	1-5	ESF	1yr	Harsh	Harsh	No (1)	M	I	
45	SIS-VLV-126B	Safety Valve	PCCV	1-5	ESF	1yr	Harsh	Harsh	No (1)	M	I	
46	SIS-VLV-126C	Safety Valve	PCCV	1-5	ESF	1yr	Harsh	Harsh	No (1)	M	I	
47	SIS-VLV-126D	Safety Valve	PCCV	1-5	ESF	1yr	Harsh	Harsh	No (1)	M	I	
48	SIS-HCV-917	Air Operated Valve	PCCV	1-5	PB	1yr	Harsh	Harsh	No (1)	M	I	
49	SIS-AOV-215A	Air Operated Valve	PCCV	1-5	PB	1yr	Harsh	Harsh	No (1)	M	I	

Table 3D-2 US-APWR Environmental Qualification Equipment List
(Sheet 32 of 64)

Item Num	Equipment Tag	Description	Location (~~PCCV, R/B, A/B, O/B,T/B, UHSRS~~)		Purpose	Operational Duration	Environmental Conditions	Radiation Condition	Influence of Submergence for Total Integrated Dose	Qualification Process	Seismic Category	Comments
			Building	Zone	RT, ESF, PAM, Paressure Boundary (PB), Other		Harsh or Mild	Harsh or Mild	Yes/No	E=Electrical M=Mechanical	I, II, Non	
50	SIS-AOV-215B	Air Operated Valve	PCCV	1-5	PB	1yr	Harsh	Harsh	No (1)	M	I	
51	SIS-AOV-215C	Air Operated Valve	PCCV	1-5	PB	1yr	Harsh	Harsh	No (1)	M	I	
52	SIS-AOV-215D	Air Operated Valve	PCCV	1-5	PB	1yr	Harsh	Harsh	No (1)	M	I	
53	SIS-AOV-201B	Air Operated Valve	PCCV	1-5	PB	1yr	Harsh	Harsh	No (1)	M	I	
54	SIS-AOV-201C	Air Operated Valve	PCCV	1-5	PB	1yr	Harsh	Harsh	No (1)	M	I	
55	SIS-HCV-989	Air Operated Valve	PCCV	1-5	PB	1yr	Harsh	Harsh	No (1)	M	I	
56	SIS-AOV-114	Air Operated Valve	R/B	6	ESF	5min	Mild	Harsh	No (1)	M	I	
Equipment (Residual Heat Removal System)												
1	RHS-RPP-001A	A-Containment Spray/Residual Heat Removal Pump	R/B	6	ESF	1yr	Mild	Harsh	No (1)	M	I	
2	RHS-RPP-001B	B-Containment Spray/Residual Heat Removal Pump	R/B	6	ESF	1yr	Mild	Harsh	No (1)	M	I	
3	RHS-RPP-001C	C-Containment Spray/Residual Heat Removal Pump	R/B	6	ESF	1yr	Mild	Harsh	No (1)	M	I	
4	RHS-RPP-001D	D-Containment Spray/Residual Heat Removal Pump	R/B	6	ESF	1yr	Mild	Harsh	No (1)	M	I	
5	RHS-RHX-001A	A-Containment Spray/Residual Heat Removal Heat Exchanger	R/B	6	ESF	1yr	Mild	Harsh	No (1)	M	I	
6	RHS-RHX-001B	B-Containment Spray/Residual Heat Removal Heat Exchanger	R/B	6	ESF	1yr	Mild	Harsh	No (1)	M	I	
7	RHS-RHX-001C	C-Containment Spray/Residual Heat Removal Heat Exchanger	R/B	6	ESF	1yr	Mild	Harsh	No (1)	M	I	
8	RHS-RHX-001D	D-Containment Spray/Residual Heat Removal Heat Exchanger	R/B	6	ESF	1yr	Mild	Harsh	No (1)	M	I	
9	RHS-MOV-021A	Motor Operated Valve	R/B	6	ESF	1yr	Mild	Harsh	No (1)	M	I	
10	RHS-MOV-021B	Motor Operated Valve	R/B	6	ESF	1yr	Mild	Harsh	No (1)	M	I	
11	RHS-MOV-001A	Motor Operated Valve	PCCV	6	ESF	1yr	Harsh	Harsh	No (1)	M	I	
12	RHS-MOV-001B	Motor Operated Valve	PCCV	1-4	ESF	1yr	Harsh	Harsh	No (1)	M	I	
13	RHS-MOV-002A	Motor Operated Valve	PCCV	1-4	ESF	1yr	Harsh	Harsh	No (1)	M	I	
14	RHS-MOV-002B	Motor Operated Valve	PCCV	1-5	ESF	1yr	Harsh	Harsh	No (1)	M	I	

Table 3D-2 US-APWR Environmental Qualification Equipment List
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Item Num	Equipment Tag	Description	Location (~~PCCV, R/B, A/B, O/B,T/B, UHSRS~~)		Purpose	Operational Duration	Environmental Conditions	Radiation Condition	Influence of Submergence for Total Integrated Dose	Qualification Process	Seismic Category	Comments
			Building	Zone	RT, ESF, PAM, Paressure Boundary (PB), Other		Harsh or Mild	Harsh or Mild	Yes/No	E=Electrical M=Mechanical	I, II, Non	
15	RHS-MOV-025A	Motor Operated Valve	PCCV	1-5	ESF	1yr	Harsh	Harsh	No (1)	M	I	
16	RHS-MOV-025B	Motor Operated Valve	PCCV	1-5	ESF	1yr	Harsh	Harsh	No (1)	M	I	
17	RHS-MOV-026A	Motor Operated Valve	PCCV	1-5	ESF	1yr	Harsh	Harsh	No (1)	M	I	
18	RHS-MOV-026B	Motor Operated Valve	PCCV	1-5	ESF	1yr	Harsh	Harsh	No (1)	M	I	
19	RHS-HCV-603	Hand Control Valve	R/B	6	PB	1yr	Mild	Harsh	No (1)	M	I	
20	RHS-FCV-601	Flow Control Valve	R/B	6	PB	1yr	Mild	Harsh	No (1)	M	I	
21	RHS-AOV-024A	Air Operated Valve	PCCV	1-5	PB	1yr	Harsh	Harsh	No (1)	M	I	
22	RHS-MOV-021C	Motor Operated Valve	R/B	6	ESF	1yr	Mild	Harsh	No (1)	M	I	
23	RHS-MOV-021D	Motor Operated Valve	R/B	6	ESF	1yr	Mild	Harsh	No (1)	M	I	
24	RHS-MOV-001C	Motor Operated Valve	PCCV	1-4	ESF	1yr	Harsh	Harsh	No (1)	M	I	
25	RHS-MOV-001D	Motor Operated Valve	PCCV	1-4	ESF	1yr	Harsh	Harsh	No (1)	M	I	
26	RHS-MOV-002C	Motor Operated Valve	PCCV	1-5	ESF	1yr	Harsh	Harsh	No (1)	M	I	
27	RHS-MOV-002D	Motor Operated Valve	PCCV	1-5	ESF	1yr	Harsh	Harsh	No (1)	M	I	
28	RHS-MOV-025C	Motor Operated Valve	PCCV	1-5	ESF	1yr	Harsh	Harsh	No (1)	M	I	
29	RHS-MOV-025D	Motor Operated Valve	PCCV	1-5	ESF	1yr	Harsh	Harsh	No (1)	M	I	
30	RHS-MOV-026C	Motor Operated Valve	PCCV	1-5	ESF	1yr	Harsh	Harsh	No (1)	M	I	
31	RHS-MOV-026D	Motor Operated Valve	PCCV	1-5	ESF	1yr	Harsh	Harsh	No (1)	M	I	
32	RHS-HCV-633	Hand Control Valve	R/B	6	PB	1yr	Mild	Harsh	No (1)	M	I	
33	RHS-FCV-631	Flow Control Valve	R/B	6	PB	1yr	Mild	Harsh	No (1)	M	I	
34	RHS-AOV-024D	Air Operated Valve	PCCV	1-5	PB	1yr	Harsh	Harsh	No (1)	M	I	
35	RHS-VLV-003A	Safety Valve	PCCV	1-5	ESF	1yr	Harsh	Harsh	No (1)	M	I	
36	RHS-VLV-003B	Safety Valve	PCCV	1-5	ESF	1yr	Harsh	Harsh	No (1)	M	I	
37	RHS-VLV-003C	Safety Valve	PCCV	1-5	ESF	1yr	Harsh	Harsh	No (1)	M	I	
38	RHS-VLV-003D	Safety Valve	PCCV	1-5	ESF	1yr	Harsh	Harsh	No (1)	M	I	
39	RHS-VLV-023A	Safety Valve	PCCV	1-5	ESF	1yr	Harsh	Harsh	No (1)	M	I	

Table 3D-2 US-APWR Environmental Qualification Equipment List
(Sheet 34 of 64)

Item Num	Equipment Tag	Description	Location (~~PCCV, R/B, A/B, O/B,T/B, UHSRS~~)		Purpose	Operational Duration	Environmental Conditions	Radiation Condition	Influence of Submergence for Total Integrated Dose	Qualification Process	Seismic Category	Comments
			Building	Zone	RT, ESF, PAM, Paressure Boundary (PB), Other		Harsh or Mild	Harsh or Mild	Yes/No	E=Electrical M=Mechanical	I, II, Non	
40	RHS-VLV-023B	Safety Valve	PCCV	1-5	ESF	1yr	Harsh	Harsh	No (1)	M	I	
41	RHS-VLV-023C	Safety Valve	PCCV	1-5	ESF	1yr	Harsh	Harsh	No (1)	M	I	
42	RHS-VLV-023D	Safety Valve	PCCV	1-5	ESF	1yr	Harsh	Harsh	No (1)	M	I	
Equipment (Emergency Feedwater System)												
1	EFS-RPP-001A	A-Emergency Feedwater Pump	R/B	8	ESF	2wks	Mild	Harsh	No (1)	M	I	
2	EFS-RPP-001B	B-Emergency Feedwater Pump	R/B	8	ESF	2wks	Mild	Harsh	No (1)	M	I	
3	EFS-RPP-001C	C-Emergency Feedwater Pump	R/B	8	ESF	2wks	Mild	Harsh	No (1)	M	I	
4	EFS-RPP-001D	D-Emergency Feedwater Pump	R/B	8	ESF	2wks	Mild	Harsh	No (1)	M	I	
5	EFS-RPT-001A	A-Emergency Feedwater Pit	R/B	14	ESF	2wks	Mild	Mild	No (1)	M	I	
6	EFS-RPK-001B	B- Emergency Feedwater Pit	R/B	14	ESF	2wks	Mild	Mild	No (1)	M	I	
7	EFS-MOV-014A	Motor Operated Valve	R/B	8	ESF	2wks	Mild	Harsh	No (1)	M	I	
8	EFS-MOV-014B	Motor Operated Valve	R/B	8	ESF	2wks	Mild	Harsh	No (1)	M	I	
9	EFS-MOV-014C	Motor Operated Valve	R/B	8	ESF	2wks	Mild	Harsh	No (1)	M	I	
10	EFS-MOV-014D	Motor Operated Valve	R/B	8	ESF	2wks	Mild	Harsh	No (1)	M	I	
11	EFS-MOV-017A	A-Emergency Feedwater Control Valve	R/B	10	ESF	2wks	Harsh	Harsh	No (1)	M	I	
12	EFS-MOV-017B	B-Emergency Feedwater Control Valve	R/B	10	ESF	2wks	Harsh	Harsh	No (1)	M	I	
13	EFS-MOV-017C	C-Emergency Feedwater Control Valve	R/B	10	ESF	2wks	Harsh	Harsh	No (1)	M	I	
14	EFS-MOV-017D	D-Emergency Feedwater Control Valve	R/B	10	ESF	2wks	Harsh	Harsh	No (1)	M	I	
15	EFS-MOV-019A	A-Emergency Feedwater Isolation Valve	R/B	10	ESF	2wks	Mild	Harsh	No (1)	M	I	
16	EFS-MOV-019B	B-Emergency Feedwater Isolation Valve	R/B	10	ESF	2wks	Mild	Harsh	No (1)	M	I	
17	EFS-MOV-019C	C-Emergency Feedwater Isolation Valve	R/B	10	ESF	2wks	Mild	Harsh	No (1)	M	I	

Table 3D-2 US-APWR Environmental Qualification Equipment List
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Item Num	Equipment Tag	Description	Location (~~PCCV, R/B, A/B, O/B,T/B, UHSRS~~)		Purpose	Operational Duration	Environmental Conditions	Radiation Condition	Influence of Submergence for Total Integrated Dose	Qualification Process	Seismic Category	Comments
			Building	Zone	RT, ESF, PAM, Paressure Boundary (PB), Other		Harsh or Mild	Harsh or Mild	Yes/No	E=Electrical M=Mechanical	I, II, Non	
18	EFS-MOV-019D	D-Emergency Feedwater Isolation Valve	R/B	10	ESF	2wks	Mild	Harsh	No (1)	M	I	
19	EFS-MOV-101A	A-Emergency Feedwater Pump A-Main Steam Line Steam Isolation Valve	R/B	10	ESF	2wks	Harsh	Harsh	No (1)	M	I	
20	EFS-MOV-101B	A-Emergency Feedwater Pump B-Main Steam Line Steam Isolation Valve	R/B	10	ESF	2wks	Harsh	Harsh	No (1)	M	I	
21	EFS-MOV-101C	D-Emergency Feedwater Pump C-Main Steam Line Steam Isolation Valve	R/B	10	ESF	2wks	Harsh	Harsh	No (1)	M	I	
22	EFS-MOV-101D	D-Emergency Feedwater Pump D-Main Steam Line Steam Isolation Valve	R/B	10	ESF	2wks	Harsh	Harsh	No (1)	M	I	
23	EFS-MOV-103A	A-Emergency Feedwater Pump Actuation Valve	R/B	10	ESF	2wks	Harsh	Harsh	No (1)	M	I	
24	EFS-MOV-103D	B-Emergency Feedwater Pump Actuation Valve	R/B	10	ESF	2wks	Harsh	Harsh	No (1)	M	I	
Equipment (Main Feedwater System)												
1	NFS-VLV-512A	A-Main Feedwater Isolation Valve	R/B	10	ESF	5min	Harsh	Harsh	No (2)	M	I	
2	NFS-VLV-512B	B-Main Feedwater Isolation Valve	R/B	10	ESF	5min	Harsh	Harsh	No (2)	M	I	
3	NFS-VLV-512C	C-Main Feedwater Isolation Valve	R/B	10	ESF	5min	Harsh	Harsh	No (2)	M	I	
4	NFS-VLV-512D	D-Main Feedwater Isolation Valve	R/B	10	ESF	5min	Harsh	Harsh	No (2)	M	I	
5	NFS-MOV-514A	Motor Operated Valve	R/B	10	PB	2wks	Harsh	Harsh	No (2)	M	I	
6	NFS-MOV-514B	Motor Operated Valve	R/B	10	PB	2wks	Harsh	Harsh	No (2)	M	I	
7	NFS-MOV-514C	Motor Operated Valve	R/B	10	PB	2wks	Harsh	Harsh	No (2)	M	I	
8	NFS-MOV-514D	Motor Operated Valve	R/B	10	PB	2wks	Harsh	Harsh	No (2)	M	I	
9	NFS-FCV-460	A-Main Feedwater Regulation Valve	R/B	10	ESF	5min	Harsh	Harsh	No (2)	M	Non	
10	NFS-FCV-470	B-Main Feedwater Regulation Valve	R/B	10	ESF	5min	Harsh	Harsh	No (2)	M	Non	

Table 3D-2 US-APWR Environmental Qualification Equipment List
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Item Num	Equipment Tag	Description	Location (~~PCCV, R/B, A/B, O/B,T/B, UHSRS~~)		Purpose	Operational Duration	Environmental Conditions	Radiation Condition	Influence of Submergence for Total Integrated Dose	Qualification Process	Seismic Category	Comments
			Building	Zone	RT, ESF, PAM, Paressure Boundary (PB), Other		Harsh or Mild	Harsh or Mild	Yes/No	E=Electrical M=Mechanical	I, II, Non	
11	NFS-FCV-480	C-Main Feedwater Regulation Valve	R/B	10	ESF	5min	Harsh	Harsh	No (2)	M	Non	
12	NFS-FCV-490	D-Main Feedwater Regulation Valve	R/B	10	ESF	5min	Harsh	Harsh	No (2)	M	I	
13	NFS-FCV-461	A-Main Feedwater Bypass Regulation Valve	R/B	10	ESF	5min	Harsh	Harsh	No (2)	M	I	
14	NFS-FCV-471	B-Main Feedwater Bypass Regulation Valve	R/B	10	ESF	5min	Harsh	Harsh	No (2)	M	I	
15	NFS-FCV-481	C-Main Feedwater Bypass Regulation Valve	R/B	10	ESF	5min	Harsh	Harsh	No (2)	M	I	
16	NFS-FCV-491	D-Main Feedwater Bypass Regulation Valve	R/B	10	ESF	5min	Harsh	Harsh	No (2)	M	I	
17	NFS-LCV-3710	A-Steam Generator Water Filling Control Valve	R/B	10	ESF	5min	Harsh	Harsh	No (2)	M	I	
18	NFS-LCV-3720	B-Steam Generator Water Filling Control Valve	R/B	10	ESF	5min	Harsh	Harsh	No (2)	M	I	
19	NFS-LCV-3730	C-Steam Generator Water Filling Control Valve	R/B	10	ESF	5min	Harsh	Harsh	No (2)	M	I	
20	NFS-LCV-3740	D-Steam Generator Water Filling Control Valve	R/B	10	ESF	5min	Harsh	Harsh	No (2)	M	I	
Equipment (Main Steam System)												
1	NMS-VLV-509A	A1-Main Steam Safety Valve	R/B	10	ESF	5min	Harsh	Harsh	No (1)	M	I	
2	NMS-VLV-510A	A2-Main Steam Safety Valve	R/B	10	ESF	5min	Harsh	Harsh	No (1)	M	I	
3	NMS-VLV-511A	A3-Main Steam Safety Valve	R/B	10	ESF	5min	Harsh	Harsh	No (1)	M	I	
4	NMS-VLV-512A	A4-Main Steam Safety Valve	R/B	10	ESF	5min	Harsh	Harsh	No (1)	M	I	
5	NMS-VLV-513A	A5-Main Steam Safety Valve	R/B	10	ESF	5min	Harsh	Harsh	No (1)	M	I	
6	NMS-VLV-514A	A6-Main Steam Safety Valve	R/B	10	ESF	5min	Harsh	Harsh	No (1)	M	I	
7	NMS-VLV-509B	B1-Main Steam Safety Valve	R/B	10	ESF	5min	Harsh	Harsh	No (1)	M	I	
8	NMS-VLV-510B	B2-Main Steam Safety Valve	R/B	10	ESF	5min	Harsh	Harsh	No (1)	M	I	
9	NMS-VLV-511B	B3-Main Steam Safety Valve	R/B	10	ESF	5min	Harsh	Harsh	No (1)	M	I	
10	NMS-VLV-512B	B4-Main Steam Safety Valve	R/B	10	ESF	5min	Harsh	Harsh	No (1)	M	I	

Table 3D-2 US-APWR Environmental Qualification Equipment List
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Item Num	Equipment Tag	Description	Location (~~PCCV, R/B, A/B, O/B,T/B, UHSRS~~)		Purpose	Operational Duration	Environmental Conditions	Radiation Condition	Influence of Submergence for Total Integrated Dose	Qualification Process	Seismic Category	Comments
			Building	Zone	RT, ESF, PAM, Paressure Boundary (PB), Other		Harsh or Mild	Harsh or Mild	Yes/No	E=Electrical M=Mechanical	I, II, Non	
11	NMS-VLV-513B	B5-Main Steam Safety Valve	R/B	10	ESF	5min	Harsh	Harsh	No (1)	M	I	
12	NMS-VLV-514B	B6-Main Steam Safety Valve	R/B	10	ESF	5min	Harsh	Harsh	No (1)	M	I	
13	NMS-VLV-509C	C1-Main Steam Safety Valve	R/B	10	ESF	5min	Harsh	Harsh	No (1)	M	I	
14	NMS-VLV-510C	C2-Main Steam Safety Valve	R/B	10	ESF	5min	Harsh	Harsh	No (1)	M	I	
15	NMS-VLV-511C	C3-Main Steam Safety Valve	R/B	10	ESF	5min	Harsh	Harsh	No (1)	M	I	
16	NMS-VLV-512C	C4-Main Steam Safety Valve	R/B	10	ESF	5min	Harsh	Harsh	No (1)	M	I	
17	NMS-VLV-513C	C5-Main Steam Safety Valve	R/B	10	ESF	5min	Harsh	Harsh	No (1)	M	I	
18	NMS-VLV-514C	C6-Main Steam Safety Valve	R/B	10	ESF	5min	Harsh	Harsh	No (1)	M	I	
19	NMS-VLV-509D	D1-Main Steam Safety Valve	R/B	10	ESF	5min	Harsh	Harsh	No (1)	M	I	
20	NMS-VLV-510D	D2-Main Steam Safety Valve	R/B	10	ESF	5min	Harsh	Harsh	No (1)	M	I	
21	NMS-VLV-511D	D3-Main Steam Safety Valve	R/B	10	ESF	5min	Harsh	Harsh	No (1)	M	I	
22	NMS-VLV-512D	D4-Main Steam Safety Valve	R/B	10	ESF	5min	Harsh	Harsh	No (1)	M	I	
23	NMS-VLV-513D	D5-Main Steam Safety Valve	R/B	10	ESF	5min	Harsh	Harsh	No (1)	M	I	
24	NMS-VLV-514D	D6-Main Steam Safety Valve	R/B	10	ESF	5min	Harsh	Harsh	No (1)	M	I	
25	NMS-MOV-507A	A-Main Steam Relief Valve Block Valve	R/B	10	ESF	1yr	Harsh	Harsh	No (1)	M	I	
26	NMS-MOV-507B	B-Main Steam Relief Valve Block Valve	R/B	10	ESF	1yr	Harsh	Harsh	No (1)	M	I	
27	NMS-MOV-507C	C-Main Steam Relief Valve Block Valve	R/B	10	ESF	1yr	Harsh	Harsh	No (1)	M	I	
28	NMS-MOV-507D	D-Main Steam Relief Valve Block Valve	R/B	10	ESF	1yr	Harsh	Harsh	No (1)	M	I	
29	NMS-MOV-508A	A-Main Steam Depressurization Valve	R/B	10	ESF	1yr	Harsh	Harsh	No (1)	M	I	
30	NMS-MOV-508B	B-Main Steam Depressurization Valve	R/B	10	ESF	1yr	Harsh	Harsh	No (1)	M	I	
31	NMS-MOV-508C	C-Main Steam Depressurization Valve	R/B	10	ESF	1yr	Harsh	Harsh	No (1)	M	I	
32	NMS-MOV-508D	D-Main Steam Depressurization Valve	R/B	10	ESF	1yr	Harsh	Harsh	No (1)	M	I	

Table 3D-2 US-APWR Environmental Qualification Equipment List
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Item Num	Equipment Tag	Description	Location (~~PCCV, R/B, A/B, O/B,T/B, UHSRS~~)		Purpose	Operational Duration	Environmental Conditions	Radiation Condition	Influence of Submergence for Total Integrated Dose	Qualification Process	Seismic Category	Comments
			Building	Zone	RT, ESF, PAM, Paressure Boundary (PB), Other		Harsh or Mild	Harsh or Mild	Yes/No	E=Electrical M=Mechanical	I, II, Non	
33	NMS-AOV-515A	A-Main Steam Isolation Valve	R/B	10	ESF	1yr	Harsh	Harsh	No (1)	M	I	
34	NMS-AOV-515B	B-Main Steam Isolation Valve	R/B	10	ESF	1yr	Harsh	Harsh	No (1)	M	I	
35	NMS-AOV-515C	C-Main Steam Isolation Valve	R/B	10	ESF	1yr	Harsh	Harsh	No (1)	M	I	
36	NMS-AOV-515D	D-Main Steam Isolation Valve	R/B	10	ESF	1yr	Harsh	Harsh	No (1)	M	I	
37	NMS-HCV-3615	A-Main Steam Bypass Isolation Valve	R/B	10	ESF	5min	Harsh	Harsh	No (1)	M	I	
38	NMS-HCV-3625	B-Main Steam Bypass Isolation Valve	R/B	10	ESF	5min	Harsh	Harsh	No (1)	M	I	
39	NMS-HCV-3635	C-Main Steam Bypass Isolation Valve Hand Control Valve	R/B	10	ESF	5min	Harsh	Harsh	No (1)	M	I	
40	NMS-HCV-3645	D-Main Steam Bypass Isolation Valve Hand Control Valve	R/B	10	ESF	5min	Harsh	Harsh	No (1)	M	I	
41	NMS-PCV-465	A-Main Steam Relief Valve	R/B	10	PB	1yr	Harsh	Harsh	No (1)	M	I	
42	NMS-PCV-475	B-Main Steam Relief Valve	R/B	10	PB	1yr	Harsh	Harsh	No (1)	M	I	
43	NMS-PCV-485	C-Main Steam Relief Valve	R/B	10	PB	1yr	Harsh	Harsh	No (1)	M	I	
44	NMS-PCV-495	D-Main Steam Relief Valve	R/B	10	PB	1yr	Harsh	Harsh	No (1)	M	I	
45	NMS-TCV-500A	A-Turbine Bypass Valve	T/B	14	ESF	5min	Mild	Mild	No (3)	M	Non	
46	NMS-TCV-500B	B-Turbine Bypass Valve	T/B	14	ESF	5min	Mild	Mild	No (3)	M	Non	
47	NMS-TCV-500C	C-Turbine Bypass Valve	T/B	14	ESF	5min	Mild	Mild	No (3)	M	Non	
48	NMS-TCV-500D	D-Turbine Bypass Valve	T/B	14	ESF	5min	Mild	Mild	No (3)	M	Non	
49	NMS-TCV-500E	E-Turbine Bypass Valve	T/B	14	ESF	5min	Mild	Mild	No (3)	M	Non	
50	NMS-TCV-500F	F-Turbine Bypass Valve	T/B	14	ESF	5min	Mild	Mild	No (3)	M	Non	
51	NMS-TCV-500G	G-Turbine Bypass Valve	T/B	14	ESF	5min	Mild	Mild	No (3)	M	Non	
52	NMS-TCV-500H	H-Turbine Bypass Valve	T/B	14	ESF	5min	Mild	Mild	No (3)	M	Non	
53	NMS-TCV-500J	J-Turbine Bypass Valve	T/B	14	ESF	5min	Mild	Mild	No (3)	M	Non	
54	NMS-TCV-500K	K-Turbine Bypass Valve	T/B	14	ESF	5min	Mild	Mild	No (3)	M	Non	
55	NMS-TCV-500L	L-Turbine Bypass Valve	T/B	14	ESF	5min	Mild	Mild	No (3)	M	Non	

Attachment 1
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Table 3D-2 US-APWR Environmental Qualification Equipment List
(Sheet 39 of 64)

Item Num	Equipment Tag	Description	Location (~~PCCV, R/B, A/B, O/B,T/B, UHSRS~~)		Purpose	Operational Duration	Environmental Conditions	Radiation Condition	Influence of Submergence for Total Integrated Dose	Qualification Process	Seismic Category	Comments
			Building	Zone	RT, ESF, PAM, Paressure Boundary (PB), Other		Harsh or Mild	Harsh or Mild	Yes/No	E=Electrical M=Mechanical	I, II, Non	
56	NMS-TCV-500M	M-Turbine Bypass Valve	T/B	14	ESF	5min	Mild	Mild	No (3)	M	Non	
57	NMS-TCV-500N	N-Turbine Bypass Valve	T/B	14	ESF	5min	Mild	Mild	No (3)	M	Non	
58	NMS-TCV-500P	P-Turbine Bypass Valve	T/B	14	ESF	5min	Mild	Mild	No (3)	M	Non	
59	NMS-TCV-500Q	Q-Turbine Bypass Valve	T/B	14	ESF	5min	Mild	Mild	No (3)	M	Non	
60	NMS-MOV-701A	A-Main Steam Drain Isolation Valve	R/B	10	ESF	1yr	Harsh	Harsh	No (1)	M	I	
61	NMS-MOV-701B	B-Main Steam Drain Isolation Valve	R/B	10	ESF	1yr	Harsh	Harsh	No (1)	M	I	
62	NMS-MOV-701C	C-Main Steam Drain Isolation Valve	R/B	10	ESF	1yr	Harsh	Harsh	No (1)	M	I	
63	NMS-MOV-701D	D-Main Steam Drain Isolation Valve	R/B	10	ESF	1yr	Harsh	Harsh	No (1)	M	I	
Equipment (Containment Spray System)												
64	CSS-COT-001	Spray Nozzle	PCCV	1-6	ESF	1yr	Harsh	Harsh	No (1)	M	I	
65	CSS-MOV-004A	Motor Operated Valve	R/B	6	ESF	1yr	Mild	Harsh	No (1)	M	I	
66	CSS-MOV-004B	Motor Operated Valve	R/B	6	ESF	1yr	Mild	Harsh	No (1)	M	I	
67	CSS-MOV-001A	Motor Operated Valve	R/B	6	ESF	1yr	Harsh	Harsh	No (1)	M	I	
68	CSS-MOV-001B	Motor Operated Valve	R/B	6	ESF	1yr	Harsh	Harsh	No (1)	M	I	
69	CSS-MOV-004C	Motor Operated Valve	R/B	6	ESF	1yr	Mild	Harsh	No (1)	M	I	
70	CSS-MOV-004D	Motor Operated Valve	R/B	6	ESF	1yr	Mild	Harsh	No (1)	M	I	
71	CSS-MOV-001C	Motor Operated Valve	R/B	6	ESF	1yr	Harsh	Harsh	No (1)	M	I	
72	CSS-MOV-001D	Motor Operated Valve	R/B	6	ESF	1yr	Harsh	Harsh	No (1)	M	I	
73	CSS-MOV-011	Motor Operated Valve	R/B	6	PB	1yr	Mild	Harsh	No (1)	M	I	
Equipment (Component Cooling Water System)												
1	NCS-RPP-001A	A-Component Cooling Water Pump	R/B	8	ESF	1yr	Mild	Harsh	No (1)	M	I	
2	NCS-RPP-001B	B-Component Cooling Water Pump	R/B	8	ESF	1yr	Mild	Harsh	No (1)	M	I	

Table 3D-2 US-APWR Environmental Qualification Equipment List
(Sheet 40 of 64)

Item Num	Equipment Tag	Description	Location (~~PCCV, R/B, A/B, O/B,T/B, UHSRS~~)		Purpose	Operational Duration	Environmental Conditions	Radiation Condition	Influence of Submergence for Total Integrated Dose	Qualification Process	Seismic Category	Comments
			Building	Zone	RT, ESF, PAM, Paressure Boundary (PB), Other		Harsh or Mild	Harsh or Mild	Yes/No	E=Electrical M=Mechanical	I, II, Non	
3	NCS-RPP-001C	C-Component Cooling Water Pump	R/B	8	ESF	1yr	Mild	Harsh	No (1)	M	I	
4	NCS-RPP-001D	D-Component Cooling Water Pump	R/B	8	ESF	1yr	Mild	Harsh	No (1)	M	I	
5	NCS-RTK-001A	A-Component Cooling Water Surge Tank	R/B	8	ESF	1yr	Mild	Harsh	No (1)	M	I	
6	NCS-RTK-001B	B-Component Cooling Water Surge Tank	R/B	8	ESF	1yr	Mild	Harsh	No (1)	M	I	
7	NCS-RHX-001A	A-Component Cooling Water Heat Exchanger	R/B	8	ESF	1yr	Mild	Harsh	No (1)	M	I	
8	NCS-RHX-001B	B-Component Cooling Water Heat Exchanger	R/B	8	ESF	1yr	Mild	Harsh	No (1)	M	I	
9	NCS-RHX-001C	C-Component Cooling Water Heat Exchanger	R/B	8	ESF	1yr	Mild	Harsh	No (1)	M	I	
10	NCS-RHX-001D	D-Component Cooling Water Heat Exchanger	R/B	8	ESF	1yr	Mild	Harsh	No (1)	M	I	
11	NCS-VLV-003A	Safety Valve	R/B	8	ESF	1yr	Mild	Harsh	No (1)	M	I	
12	NCS-VLV-003B	Safety Valve	R/B	8	ESF	1yr	Mild	Harsh	No (1)	M	I	
13	NCS-MOV-007A	Motor Operated Valve	R/B	8	ESF	1yr	Mild	Harsh	No (1)	M	I	
14	NCS-MOV-007B	Motor Operated Valve	R/B	8	ESF	1yr	Mild	Harsh	No (1)	M	I	
15	NCS-MOV-020A	Motor Operated Valve	R/B	8	ESF	1yr	Mild	Harsh	No (1)	M	I	
16	NCS-MOV-020B	Motor Operated Valve	R/B	8	ESF	1yr	Mild	Harsh	No (1)	M	I	
17	NCS-VLV-035A	Safety Valve	R/B	8	ESF	1yr	Mild	Harsh	No (1)	M	I	
18	NCS-VLV-035B	Safety Valve	R/B	8	ESF	1yr	Mild	Harsh	No (1)	M	I	
19	NCS-RCV-056A	Radiation Control Valve	R/B	8	PB	1yr	Mild	Harsh	No (1)	M	I	
20	NCS-LCV-1200	Level Control Valve	R/B	8	PB	1yr	Mild	Harsh	No (1)	M	I	
21	NCS-MOV-007C	Motor Operated Valve	R/B	8	ESF	1yr	Mild	Harsh	No (1)	M	I	
22	NCS-MOV-007D	Motor Operated Valve	R/B	8	ESF	1yr	Mild	Harsh	No (1)	M	I	
23	NCS-MOV-020C	Motor Operated Valve	R/B	8	ESF	1yr	Mild	Harsh	No (1)	M	I	

Table 3D-2 US-APWR Environmental Qualification Equipment List
(Sheet 41 of 64)

Item Num	Equipment Tag	Description	Location (~~PCCV, R/B, A/B, O/B,T/B, UHSRS~~)		Purpose	Operational Duration	Environmental Conditions	Radiation Condition	Influence of Submergence for Total Integrated Dose	Qualification Process	Seismic Category	Comments
			Building	Zone	RT, ESF, PAM, Paressure Boundary (PB), Other		Harsh or Mild	Harsh or Mild	Yes/No	E=Electrical M=Mechanical	I, II, Non	
24	NCS-MOV-020D	Motor Operated Valve	R/B	8	ESF	1yr	Mild	Harsh	No (1)	M	I	
25	NCS-RCV-056B	Radiation Control Valve	R/B	8	PB	1yr	Mild	Harsh	No (1)	M	I	
26	NCS-LCV-1210	Level Control Valve	R/B	8	PB	1yr	Mild	Harsh	No (1)	M	I	
27	NCS-MOV-145A	Motor Operated Valve	R/B	13-3	ESF	1yr	Mild	Harsh	No (1)	M	I	
28	NCS-MOV-436B	Motor Operated Valve	PCCV	1-5	ESF	1yr	Harsh	Harsh	No (1)	M	I	
29	NCS-MOV-438A	Motor Operated Valve	R/B	6	ESF	1yr	Mild	Harsh	No (1)	M	I	
30	NCS-MOV-145B	Motor Operated Valve	R/B	13-3	ESF	1yr	Mild	Harsh	No (1)	M	I	
31	NCS-MOV-145C	Motor Operated Valve	R/B	13-3	ESF	1yr	Mild	Harsh	No (1)	M	I	
32	NCS-MOV-145D	Motor Operated Valve	R/B	13-3	ESF	1yr	Mild	Harsh	No (1)	M	I	
33	NCS-MOV-232A	Motor Operated Valve	R/B	6	ESF	1yr	Mild	Harsh	No (1)	M	I	
34	NCS-MOV-232B	Motor Operated Valve	R/B	6	ESF	1yr	Mild	Harsh	No (1)	M	I	
35	NCS-MOV-233A	Motor Operated Valve	R/B	6	ESF	1yr	Mild	Harsh	No (1)	M	I	
36	NCS-MOV-233B	Motor Operated Valve	R/B	6	ESF	1yr	Mild	Harsh	No (1)	M	I	
37	NCS-MOV-234A	Motor Operated Valve	R/B	6	ESF	1yr	Mild	Harsh	No (1)	M	I	
38	NCS-MOV-234B	Motor Operated Valve	R/B	6	ESF	1yr	Mild	Harsh	No (1)	M	I	
39	NCS-MOV-316A	Motor Operated Valve	R/B	7	PB	1yr	Mild	Harsh	No (1)	M	I	
40	NCS-MOV-316B	Motor Operated Valve	R/B	13-3	PB	1yr	Mild	Harsh	No (1)	M	I	
41	NCS-VLV-406A	Safety Valve	PCCV	1-5	ESF	1yr	Harsh	Harsh	No (1)	M	I	
42	NCS-VLV-406B	Safety Valve	PCCV	1-5	ESF	1yr	Harsh	Harsh	No (1)	M	I	
43	NCS-VLV-406C	Safety Valve	PCCV	1-5	ESF	1yr	Harsh	Harsh	No (1)	M	I	
44	NCS-VLV-406D	Safety Valve	PCCV	1-5	ESF	1yr	Harsh	Harsh	No (1)	M	I	
45	NCS-VLV-435A	Safety Valve	PCCV	1-5	ESF	1yr	Harsh	Harsh	No (1)	M	I	
46	NCS-VLV-435B	Safety Valve	PCCV	1-5	ESF	1yr	Harsh	Harsh	No (1)	M	I	
47	NCS-MOV-436A	Motor Operated Valve	PCCV	1-5	ESF	1yr	Harsh	Harsh	No (1)	M	I	

Table 3D-2 US-APWR Environmental Qualification Equipment List
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Item Num	Equipment Tag	Description	Location (~~PCCV, R/B, A/B, O/B,T/B, UHSRS~~)		Purpose	Operational Duration	Environmental Conditions	Radiation Condition	Influence of Submergence for Total Integrated Dose	Qualification Process	Seismic Category	Comments
			Building	Zone	RT, ESF, PAM, Paressure Boundary (PB), Other		Harsh or Mild	Harsh or Mild	Yes/No	E=Electrical M=Mechanical	I, II, Non	
48	NCS-FCV-1321A	Flow Control Valve	PCCV	1-5	ESF	1yr	Harsh	Harsh	No (1)	M	I	
49	NCS-FCV-1321B	Flow Control Valve	PCCV	1-5	ESF	1yr	Harsh	Harsh	No (1)	M	I	
50	NCS-MOV-511	Motor Operated Valve	R/B	6	ESF	5min	Mild	Harsh	No (1)	M	I	
51	NCS-TCV-103	Temperature Control Valve	PCCV	1-5	PB	1yr	Harsh	Harsh	No (1)	M	I	
52	NCS-MOV-517	Motor Operated Valve	R/B	6	ESF	5min	Mild	Harsh	No (1)	M	I	
53	NCS-MOV-401A	Motor Operated Valve	R/B	6	ESF	1yr	Mild	Harsh	No (1)	M	I	
54	NCS-MOV-402A	Motor Operated Valve	R/B	6	ESF	1yr	Mild	Harsh	No (1)	M	I	
55	NCS-MOV-531	Motor Operated Valve	R/B	6	ESF	5min	Mild	Harsh	No (1)	M	I	
56	NCS-MOV-537	Motor Operated Valve	R/B	6	ESF	5min	Mild	Harsh	No (1)	M	I	
57	NCS-FCV-1319A	Flow Control Valve	PCCV	1-5	ESF	1yr	Harsh	Harsh	No (1)	M	I	
58	NCS-FCV-1319B	Flow Control Valve	PCCV	1-5	ESF	1yr	Harsh	Harsh	No (1)	M	I	
59	NCS-MOV-401B	Motor Operated Valve	R/B	6	ESF	1yr	Mild	Harsh	No (1)	M	I	
60	NCS-MOV-402B	Motor Operated Valve	R/B	6	ESF	1yr	Mild	Harsh	No (1)	M	I	
61	NCS-MOV-446A	Motor Operated Valve	PCCV	1-5	ESF	1yr	Harsh	Harsh	No (1)	M	I	
62	NCS-MOV-446B	Motor Operated Valve	PCCV	1-5	ESF	1yr	Harsh	Harsh	No (1)	M	I	
63	NCS-MOV-446C	Motor Operated Valve	PCCV	1-5	ESF	1yr	Harsh	Harsh	No (1)	M	I	
64	NCS-MOV-446D	Motor Operated Valve	PCCV	1-5	ESF	1yr	Harsh	Harsh	No (1)	M	I	
65	NCS-MOV-445A	Motor Operated Valve	R/B	6	ESF	1yr	Mild	Harsh	No (1)	M	I	
66	NCS-MOV-445B	Motor Operated Valve	R/B	6	ESF	1yr	Mild	Harsh	No (1)	M	I	
67	NCS-MOV-447A	Motor Operated Valve	PCCV	1-5	ESF	1yr	Harsh	Harsh	No (1)	M	I	
68	NCS-MOV-447B	Motor Operated Valve	PCCV	1-5	ESF	1yr	Harsh	Harsh	No (1)	M	I	
69	NCS-MOV-448A	Motor Operated Valve	R/B	6	ESF	1yr	Mild	Harsh	No (1)	M	I	
70	NCS-MOV-448B	Motor Operated Valve	R/B	6	ESF	1yr	Mild	Harsh	No (1)	M	I	
71	NCS-FCV-1320A	Flow Control Valve	PCCV	1-5	ESF	1yr	Harsh	Harsh	No (1)	M	I	

Table 3D-2 US-APWR Environmental Qualification Equipment List
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Item Num	Equipment Tag	Description	Location (~~PCCV, R/B, A/B, O/B,T/B, UHSRS~~)		Purpose	Operational Duration	Environmental Conditions	Radiation Condition	Influence of Submergence for Total Integrated Dose	Qualification Process	Seismic Category	Comments
			Building	Zone	RT, ESF, PAM, Paressure Boundary (PB), Other		Harsh or Mild	Harsh or Mild	Yes/No	E=Electrical M=Mechanical	I, II, Non	
72	NCS-FCV-1320B	Flow Control Valve	PCCV	1-5	ESF	1yr	Harsh	Harsh	No (1)	M	I	
73	NCS-MOV-438B	Motor Operated Valve	R/B	6	ESF	5min	Mild	Harsh	No (1)	M	I	
74	NCS-FCV-1322A	Flow Control Valve	PCCV	1-5	ESF	1yr	Harsh	Harsh	No (1)	M	I	
75	NCS-FCV-1322B	Flow Control Valve	PCCV	1-5	ESF	1yr	Harsh	Harsh	No (1)	M	I	
76	NCS-VLV-513	Safety Valve	PCCV	1-5	ESF	1yr	Harsh	Harsh	No (1)	M	I	
77	NCS-VLV-533	Safety Valve	PCCV	1-5	ESF	1yr	Harsh	Harsh	No (1)	M	I	
78	NCS-AOV-601	Air Operated Valve	R/B	13-3	ESF	1yr	Mild	Harsh	No (1)	M	I	
79	NCS-AOV-602	Air Operated Valve	R/B	13-3	ESF	1yr	Mild	Harsh	No (1)	M	I	
80	NCS-AOV-661A	Air Operated Valve	R/B	14	ESF	1yr	Mild	Mild	No (1)	M	I	
81	NCS-AOV-662A	Air Operated Valve	R/B	14	ESF	1yr	Mild	Mild	No (1)	M	I	
82	NCS-AOV-661B	Air Operated Valve	R/B	14	ESF	1yr	Mild	Mild	No (1)	M	I	
83	NCS-AOV-662B	Air Operated Valve	R/B	14	ESF	1yr	Mild	Mild	No (1)	M	I	
84	NCS-PCV-1202	Pressure Control Valve	R/B	8	PB	1yr	Mild	Harsh	No (1)	M	I	
85	NCS-PCV-1212	Pressure Control Valve	R/B	8	PB	1yr	Mild	Harsh	No (1)	M	I	
Equipment (Spent Fuel Pit Cooling and Purification System)												
1	SFP-RPP-001A	A-Spent Fuel Pit Pump	R/B	6	ESF	2wks	Mild	Harsh	No (1)	M	I	
2	SFP-RPP-001B	B-Spent Fuel Pit Pump	R/B	6	ESF	2wks	Mild	Harsh	No (1)	M	I	
3	SFP-RHX-001A	A-Spent Fuel Pit Heat Exchanger	R/B	6	ESF	2wks	Mild	Harsh	No (1)	M	I	
4	SFP-RHX-001B	B-Spent Fuel Pit Heat Exchanger	R/B	6	ESF	2wks	Mild	Harsh	No (1)	M	I	
Equipment (Essential Service Water System)												
1	EWS-OPP-001A	A-Essential Service Water Pump	UHSRS	-	ESF	1yr	Mild	-	-	M	I	
2	EWS-OPP-001B	B-Essential Service Water Pump	UHSRS	-	ESF	1yr	Mild	-	-	M	I	
3	EWS-OPP-001C	C-Essential Service Water Pump	UHSRS	-	ESF	1yr	Mild	-	-	M	I	
4	EWS-OPP-001D	D-Essential Service Water Pump	UHSRS	-	ESF	1yr	Mild	-	-	M	I	

Table 3D-2 US-APWR Environmental Qualification Equipment List
(Sheet 44 of 64)

Item Num	Equipment Tag	Description	Location (~~PCCV, R/B, A/B, O/B,T/B, UHSRS~~)		Purpose	Operational Duration	Environmental Conditions	Radiation Condition	Influence of Submergence for Total Integrated Dose	Qualification Process	Seismic Category	Comments
			Building	Zone	RT, ESF, PAM, Paressure Boundary (PB), Other		Harsh or Mild	Harsh or Mild	Yes/No	E=Electrical M=Mechanical	I, II, Non	
5	EWS-OSR-001A	A-Essential Service Water Pump Outlet Strainer	UHSRS	-	ESF	1yr	Mild	-	-	M	I	
6	EWS-OSR-002A	A-Essential Service Water Pump Outlet Strainer	UHSRS	-	ESF	1yr	Mild	-	-	M	I	
7	EWS-OSR-001B	B-Essential Service Water Pump Outlet Strainer	UHSRS	-	ESF	1yr	Mild	-	-	M	I	
8	EWS-OSR-002B	B-Essential Service Water Pump Outlet Strainer	UHSRS	-	ESF	1yr	Mild	-	-	M	I	
9	EWS-OSR-001C	C-Essential Service Water Pump Outlet Strainer	UHSRS	-	ESF	1yr	Mild	-	-	M	I	
10	EWS-OSR-002C	C-Essential Service Water Pump Outlet Strainer	UHSRS	-	ESF	1yr	Mild	-	-	M	I	
11	EWS-OSR-001D	D-Essential Service Water Pump Outlet Strainer	UHSRS	-	ESF	1yr	Mild	-	-	M	I	
12	EWS-OSR-002D	D-Essential Service Water Pump Outlet Strainer	UHSRS	-	ESF	1yr	Mild	-	-	M	I	
13	EWS-RSR-003A	A-Component Cooling Water Heat Exchanger Inlet Strainer	R/B	8	ESF	1yr	Mild	Harsh	No (1)	M	I	
14	EWS-RSR-003B	B-Component Cooling Water Heat Exchanger Inlet Strainer	R/B	8	ESF	1yr	Mild	Harsh	No (1)	M	I	
15	EWS-RSR-003C	C-Component Cooling Water Heat Exchanger Inlet Strainer	R/B	8	ESF	1yr	Mild	Harsh	No (1)	M	I	
16	EWS-RSR-003D	D-Component Cooling Water Heat Exchanger Inlet Strainer	R/B	8	ESF	1yr	Mild	Harsh	No (1)	M	I	
17	EWS-MOV-503A	Motor Operated Valve	UHSRS	-	ESF	1yr	Mild	-	-	M	I	
18	EWS-MOV-503B	Motor Operated Valve	UHSRS	-	ESF	1yr	Mild	-	-	M	I	
19	EWS-MOV-503C	Motor Operated Valve	UHSRS	-	ESF	1yr	Mild	-	-	M	I	
20	EWS-MOV-503D	Motor Operated Valve	UHSRS	-	ESF	1yr	Mild	-	-	M	I	
Equipment (Liquid Radioactive Waste Management System)												
21	LMS-RCV-035A	Air Operated Valve	R/B	13-1	Other	2wks	Mild	Harsh	No (3)	M	Non	
22	LMS-RCV-035B	Air Operated Valve	R/B	13-1	Other	2wks	Mild	Harsh	No (3)	M	Non	
23	LMS-AOV-052	Air Operated Valve	PCCV	1-5	ESF	5min	Harsh	Harsh	No (1)	M	I	

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Table 3D-2 US-APWR Environmental Qualification Equipment List
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Item Num	Equipment Tag	Description	Location (~~PCCV, R/B, A/B, O/B,T/B, UHSRS~~)		Purpose	Operational Duration	Environmental Conditions	Radiation Condition	Influence of Submergence for Total Integrated Dose	Qualification Process	Seismic Category	Comments
			Building	Zone	RT, ESF, PAM, Paressure Boundary (PB), Other		Harsh or Mild	Harsh or Mild	Yes/No	E=Electrical M=Mechanical	I, II, Non	
24	LMS-AOV-053	Air Operated Valve	R/B	6	ESF	5min	Mild	Harsh	No (1)	M	I	
25	LMS-AOV-055	Air Operated Valve	PCCV	1-5	ESF	5min	Harsh	Harsh	No (1)	M	I	
26	LMS-AOV-056	Air Operated Valve	R/B	6	ESF	5min	Mild	Harsh	No (1)	M	I	
27	LMS-AOV-060	Air Operated Valve	R/B	6	ESF	5min	Mild	Harsh	No (1)	M	I	
28	LMS-AOV-1000A	Air Operated Valve	PCCV	1-5	ESF	5min	Harsh	Harsh	No (1)	M	I	
29	LMS-AOV-1000B	Air Operated Valve	R/B	6	ESF	5min	Mild	Harsh	No (1)	M	I	
30	LMS-AOV-104	Air Operated Valve	PCCV	1-5	ESF	5min	Harsh	Harsh	No (1)	M	I	
31	LMS-AOV-105	Air Operated Valve	R/B	6	ESF	5min	Mild	Harsh	No (1)	M	I	
Equipment (Solid Radioactive Waste Management System)												
1	SMS-ATK-001A	A-Spent Resin Storage Tank	A/B	13-1	Other	1yr	Mild	Harsh	No (3)	M	Non	
2	SMS-ATK-001B	B-Spent Resin Storage Tank	A/B	13-1	Other	1yr	Mild	Harsh	No (3)	M	Non	
3	SMS-AOV-023A	Air Operated Valve	A/B	13-1	Other	1yr	Mild	Harsh	No (3)	M	Non	
4	SMS-AOV-023B	Air Operated Valve	A/B	13-1	Other	1yr	Mild	Harsh	No (3)	M	Non	
5	SMS-AOV-032A	Air Operated Valve	A/B	13-1	Other	1yr	Mild	Harsh	No (3)	M	Non	
6	SMS-AOV-032B	Air Operated Valve	A/B	13-1	Other	1yr	Mild	Harsh	No (3)	M	Non	
Equipment (Process and Post Accident Sampling System)												
1	PSS-AOV-003	Air Operated Valve	PCCV	1-5	ESF	1yr	Harsh	Harsh	No (1)	M	I	
2	PSS-MOV-006	Motor Operated Valve	PCCV	1-5	ESF	1yr	Harsh	Harsh	No (1)	M	I	
3	PSS-MOV-013	Motor Operated Valve	PCCV	1-5	ESF	1yr	Harsh	Harsh	No (1)	M	I	
4	PSS-MOV-023	Motor Operated Valve	PCCV	1-5	ESF	1yr	Harsh	Harsh	No (1)	M	I	
5	PSS-MOV-031A	Motor Operated Valve	R/B	6	ESF	1yr	Mild	Harsh	No (1)	M	I	
6	PSS-MOV-031B	Motor Operated Valve	R/B	6	ESF	1yr	Mild	Harsh	No (1)	M	I	
7	PSS -MOV-052A	Motor Operated Valve	R/B	13-2	Other	1yr	Mild	Harsh	No (1)	M	I	
8	PSS -MOV-052B	Motor Operated Valve	R/B	13-2	Other	1yr	Mild	Harsh	No (1)	M	I	

Table 3D-2 US-APWR Environmental Qualification Equipment List
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Item Num	Equipment Tag	Description	Location ~~(PCCV, R/B, A/B, O/B,T/B, UHSRS)~~		Purpose	Operational Duration	Environmental Conditions	Radiation Condition	Influence of Submergence for Total Integrated Dose	Qualification Process	Seismic Category	Comments
			Building	Zone	RT, ESF, PAM, Paressure Boundary (PB), Other		Harsh or Mild	Harsh or Mild	Yes/No	E=Electrical M=Mechanical	I, II, Non	
9	PSS-AOV-062A	Air Operated Valve	PCCV	1-5	ESF	1yr	Harsh	Harsh	No (1)	M	I	
10	PSS-AOV-062B	Air Operated Valve	PCCV	1-5	ESF	1yr	Harsh	Harsh	No (1)	M	I	
11	PSS-AOV-062C	Air Operated Valve	PCCV	1-5	ESF	1yr	Harsh	Harsh	No (1)	M	I	
12	PSS-AOV-062D	Air Operated Valve	PCCV	1-5	ESF	1yr	Harsh	Harsh	No (1)	M	I	
13	PSS-AOV-063	Air Operated Valve	R/B	6	ESF	1yr	Mild	Harsh	No (1)	M	I	
14	PSS-MOV-071	Motor Operated Valve	R/B	6	ESF	1yr	Mild	Harsh	No (1)	M	I	
15	PSS-MOV-301	Motor Operated Valve	R/B	6	Other	1yr	Mild	Harsh	No (1)	M	Non	
16	PSS-MOV-312	Motor Operated Valve	R/B	6	Other	1yr	Mild	Harsh	No (1)	M	Non	
Equipment (Steam Generator Blowdown System)												
1	SGS-AOV-001A	Air Operated Valve	R/B	10	ESF	5min	Harsh	Harsh	No (1)	M	I	
2	SGS-AOV-001B	Air Operated Valve	R/B	10	ESF	5min	Harsh	Harsh	No (1)	M	I	
3	SGS-AOV-001C	Air Operated Valve	R/B	10	ESF	5min	Harsh	Harsh	No (1)	M	I	
4	SGS-AOV-001D	Air Operated Valve	R/B	10	ESF	5min	Harsh	Harsh	No (1)	M	I	
5	SGS-AOV-031A	Air Operated Valve	R/B	6	ESF	5min	Harsh	Harsh	No (1)	M	I	
6	SGS-AOV-031B	Air Operated Valve	R/B	6	ESF	5min	Harsh	Harsh	No (1)	M	I	
7	SGS-AOV-031C	Air Operated Valve	R/B	6	ESF	5min	Harsh	Harsh	No (1)	M	I	
8	SGS-AOV-031D	Air Operated Valve	R/B	6	ESF	5min	Harsh	Harsh	No (1)	M	I	
9	SGV-AOV-002A	Air Operated Valve	R/B	10	ESF	5min	Harsh	Harsh	No (1)	M	I	
10	SGV-AOV-002B	Air Operated Valve	R/B	10	ESF	5min	Harsh	Harsh	No (1)	M	I	
11	SGV-AOV-002C	Air Operated Valve	R/B	10	ESF	5min	Harsh	Harsh	No (1)	M	I	
12	SGV-AOV-002D	Air Operated Valve	R/B	10	ESF	5min	Harsh	Harsh	No (1)	M	I	
Equipment (Refueling Water Storage System)												
1	RWS-CPT-001	Refueling Water Storage Pit	PCCV	1-6	ESF	1yr	Harsh	Harsh	Yes	M	I	
2	RWS-MOV-002	Motor Operated Valve	PCCV	1-4	ESF	5min	Harsh	Harsh	No (1)	M	I	

Table 3D-2 US-APWR Environmental Qualification Equipment List
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Item Num	Equipment Tag	Description	Location (~~PCCV, R/B, A/B, O/B,T/B, UHSRS~~)		Purpose	Operational Duration	Environmental Conditions	Radiation Condition	Influence of Submergence for Total Integrated Dose	Qualification Process	Seismic Category	Comments
			Building	Zone	RT, ESF, PAM, Paressure Boundary (PB), Other		Harsh or Mild	Harsh or Mild	Yes/No	E=Electrical M=Mechanical	I, II, Non	
3	RWS-MOV-004	Motor Operated Valve	R/B	6	ESF	5min	Mild	Harsh	No (1)	M	I	
4	RWS-AOV-022	Air Operated Valve	R/B	6	ESF	5min	Mild	Harsh	No (1)	M	I	
5	RWS-RRP-001A	A-Refueling Water Recirculation Pump	R/B	6	ESF	1yr	Mild	Harsh	No (1)	M	I	
6	RWS-RRP-001B	B-Refueling Water Recirculation Pump	R/B	6	ESF	1yr	Mild	Harsh	No (1)	M	I	
Equipment (Compressed Air Supply System)												
1	CAS-MOV-002	Motor Operated Valve	R/B	6	ESF	5min	Mild	Harsh	No (1)	M	I	
Equipment (Plant Radiation Monitoring System)												
1	RMS-MOV-001	Motor Operated Valve	PCCV	1-5	ESF	1yr	Harsh	Harsh	No (1)	M	I	
2	RMS-MOV-002	Motor Operated Valve	R/B	6	ESF	1yr	Mild	Harsh	No (1)	M	I	
3	RMS-MOV-003	Motor Operated Valve	R/B	6	ESF	1yr	Mild	Harsh	No (1)	M	I	
Equipment (Main Control Room HVAC System)												
1	VRS-RAH-101A	A-Main Control Room Air Handling Unit	R/B	8	ESF	1yr	Mild	Harsh	No (1)	M	I	
2	VRS-RAH-101B	B-Main Control Room Air Handling Unit	R/B	8	ESF	1yr	Mild	Harsh	No (1)	M	I	
3	VRS-RAH-101C	C-Main Control Room Air Handling Unit	R/B	8	ESF	1yr	Mild	Harsh	No (1)	M	I	
4	VRS-RAH-101D	D-Main Control Room Air Handling Unit	R/B	8	ESF	1yr	Mild	Harsh	No (1)	M	I	
5	VRS-RFN-101A	A-Main Control Room Air Handling Unit Fan	R/B	8	ESF	1yr	Mild	Harsh	No (1)	M	I	
6	VRS-RFN-101B	B-Main Control Room Air Handling Unit Fan	R/B	8	ESF	1yr	Mild	Harsh	No (1)	M	I	
7	VRS-RFN-101C	C-Main Control Room Air Handling Unit Fan	R/B	8	ESF	1yr	Mild	Harsh	No (1)	M	I	
8	VRS-RFN-101D	D-Main Control Room Air Handling Unit Fan	R/B	8	ESF	1yr	Mild	Harsh	No (1)	M	I	
9	VRS-RCC-101A	A-Main Control Room Air Handling Unit Cooling Coil	R/B	8	ESF	1yr	Mild	Harsh	No (1)	M	I	

Table 3D-2 US-APWR Environmental Qualification Equipment List
(Sheet 48 of 64)

Item Num	Equipment Tag	Description	Location (~~PCCV, R/B, A/B, O/B,T/B, UHSRS~~)		Purpose	Operational Duration	Environmental Conditions	Radiation Condition	Influence of Submergence for Total Integrated Dose	Qualification Process	Seismic Category	Comments
			Building	Zone	RT, ESF, PAM, Paressure Boundary (PB), Other		Harsh or Mild	Harsh or Mild	Yes/No	E=Electrical M=Mechanical	I, II, Non	
10	VRS-RCC-101B	B-Main Control Room Air Handling Unit Cooling Coil	R/B	8	ESF	1yr	Mild	Harsh	No (1)	M	I	
11	VRS-RCC-101C	C-Main Control Room Air Handling Unit Cooling Coil	R/B	8	ESF	1yr	Mild	Harsh	No (1)	M	I	
12	VRS-RCC-101D	D-Main Control Room Air Handling Unit Cooling Coil	R/B	8	ESF	1yr	Mild	Harsh	No (1)	M	I	
13	VRS-REH-101A	A-Main Control Room Air Handling Unit Electric Heating Coil	R/B	8	ESF	1yr	Mild	Harsh	No (1)	M	I	
14	VRS-REH-101B	B-Main Control Room Air Handling Unit Electric Heating Coil	R/B	8	ESF	1yr	Mild	Harsh	No (1)	M	I	
15	VRS-REH-101C	C-Main Control Room Air Handling Unit Electric Heating Coil	R/B	8	ESF	1yr	Mild	Harsh	No (1)	M	I	
16	VRS-REH-101D	D-Main Control Room Air Handling Unit Electric Heating Coil	R/B	8	ESF	1yr	Mild	Harsh	No (1)	M	I	
17	VRS-RFU-111A	A-Main Control Room Emergency Filtration Unit	R/B	8	ESF	1yr	Mild	Harsh	No (1)	M	I	
18	VRS-RFU-111B	B-Main Control Room Emergency Filtration Unit	R/B	8	ESF	1yr	Mild	Harsh	No (1)	M	I	
19	VRS-RFN-111A	A-Main Control Room Emergency Filtration Unit Fan	R/B	8	ESF	1yr	Mild	Harsh	No (1)	M	I	
20	VRS-RFN-111B	B-Main Control Room Emergency Filtration Unit Fan	R/B	8	ESF	1yr	Mild	Harsh	No (1)	M	I	
21	VRS-REH-111A	A-Main Control Room Emergency Filtration Unit Electric Heating Coil	R/B	8	ESF	1yr	Mild	Harsh	No (1)	M	I	
22	VRS-REH-111B	B-Main Control Room Emergency Filtration Unit Electric Heating Coil	R/B	8	ESF	1yr	Mild	Harsh	No (1)	M	I	
23	VRS-MOD-101A	Motor Operated Damper	R/B	14	ESF	1yr	Mild	Mild	No (1)	M	I	
24	VRS-MOD-101B	Motor Operated Damper	R/B	14	ESF	1yr	Mild	Mild	No (1)	M	I	
25	VRS-MOD-102A	Motor Operated Damper	R/B	14	ESF	1yr	Mild	Mild	No (1)	M	I	
26	VRS-MOD-102B	Motor Operated Damper	R/B	14	ESF	1yr	Mild	Mild	No (1)	M	I	
27	VRS-AOD-103A	Air Operated Damper	R/B	8	ESF	5min	Mild	Mild	No (1)	M	I	
28	VRS-AOD-103B	Air Operated Damper	R/B	8	ESF	5min	Mild	Mild	No (1)	M	I	
29	VRS-MOD-104A	Motor Operated Damper	R/B	8	ESF	1yr	Mild	Harsh	No (1)	M	I	

Table 3D-2 US-APWR Environmental Qualification Equipment List
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Item Num	Equipment Tag	Description	Location (~~PCCV, R/B, A/B, O/B,T/B, UHSRS~~)		Purpose	Operational Duration	Environmental Conditions	Radiation Condition	Influence of Submergence for Total Integrated Dose	Qualification Process	Seismic Category	Comments
			Building	Zone	RT, ESF, PAM, Paressure Boundary (PB), Other		Harsh or Mild	Harsh or Mild	Yes/No	E=Electrical M=Mechanical	I, II, Non	
30	VRS-MOD-104B	Motor Operated Damper	R/B	8	ESF	1yr	Mild	Harsh	No (1)	M	I	
31	VRS-MOD-105A	Motor Operated Damper	R/B	8	ESF	1yr	Mild	Harsh	No (1)	M	I	
32	VRS-MOD-105B	Motor Operated Damper	R/B	8	ESF	1yr	Mild	Harsh	No (1)	M	I	
33	VRS-MOD-105C	Motor Operated Damper	R/B	8	ESF	1yr	Mild	Harsh	No (1)	M	I	
34	VRS-MOD-105D	Motor Operated Damper	R/B	8	ESF	1yr	Mild	Harsh	No (1)	M	I	
35	VRS-MOD-106A	Motor Operated Damper	R/B	8	ESF	1yr	Mild	Harsh	No (1)	M	I	
36	VRS-MOD-106B	Motor Operated Damper	R/B	8	ESF	1yr	Mild	Harsh	No (1)	M	I	
37	VRS-MOD-106C	Motor Operated Damper	R/B	8	ESF	1yr	Mild	Harsh	No (1)	M	I	
38	VRS-MOD-106D	Motor Operated Damper	R/B	8	ESF	1yr	Mild	Harsh	No (1)	M	I	
39	VRS-MOD-107A	Motor Operated Damper	R/B	8	ESF	1yr	Mild	Harsh	No (1)	M	I	
40	VRS-MOD-107B	Motor Operated Damper	R/B	8	ESF	1yr	Mild	Harsh	No (1)	M	I	
41	VRS-MOD-111A	Motor Operated Damper	R/B	8	ESF	1yr	Mild	Harsh	No (1)	M	I	
42	VRS-MOD-111B	Motor Operated Damper	R/B	8	ESF	1yr	Mild	Harsh	No (1)	M	I	
43	VRS-MOD-112A	Motor Operated Damper	R/B	8	ESF	1yr	Mild	Harsh	No (1)	M	I	
44	VRS-MOD-112B	Motor Operated Damper	R/B	8	ESF	1yr	Mild	Harsh	No (1)	M	I	
45	VRS-MOD-113A	Motor Operated Damper	R/B	8	ESF	1yr	Mild	Harsh	No (1)	M	I	
46	VRS-MOD-113B	Motor Operated Damper	R/B	8	ESF	1yr	Mild	Harsh	No (1)	M	I	
47	VRS-AOD-121	Air Operated Damper	R/B	2	ESF	5min	Mild	Mild	No (1)	M	I	
48	VRS-AOD-122	Air Operated Damper	R/B	8	ESF	5min	Mild	Mild	No (1)	M	I	
49	VRS-AOD-131	Air Operated Damper	R/B	2	ESF	5min	Mild	Mild	No (1)	M	I	
50	VRS-AOD-132	Air Operated Damper	R/B	8	ESF	5min	Mild	Mild	No (1)	M	I	

Table 3D-2 US-APWR Environmental Qualification Equipment List
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Item Num	Equipment Tag	Description	Location (~~PCCV, R/B, A/B, O/B,T/B, UHSRS~~)		Purpose	Operational Duration	Environmental Conditions	Radiation Condition	Influence of Submergence for Total Integrated Dose	Qualification Process	Seismic Category	Comments
			Building	Zone	RT, ESF, PAM, Paressure Boundary (PB), Other		Harsh or Mild	Harsh or Mild	Yes/No	E=Electrical M=Mechanical	I, II, Non	
Equipment (Engineered Safety Features Ventilation System)												
1	VRS-RFU-001A	A-Annulus Emergency Exhaust Filtration Unit	R/B	7	ESF	1yr	Mild	Harsh	No (1)	M	I	
2	VRS-RFU-001B	B-Annulus Emergency Exhaust Filtration Unit	R/B	7	ESF	1yr	Mild	Harsh	No (1)	M	I	
3	VRS-RFN-001A	A-Annulus Emergency Exhaust Filtration Unit Fan	R/B	7	ESF	1yr	Mild	Harsh	No (1)	M	I	
4	VRS-RFN-001B	B-Annulus Emergency Exhaust Filtration Unit Fan	R/B	7	ESF	1yr	Mild	Harsh	No (1)	M	I	
5	VRS-MOD-001A	Motor Operated Damper	R/B	7	ESF	1yr	Mild	Harsh	No (1)	M	I	
6	VRS-MOD-001B	Motor Operated Damper	R/B	7	ESF	1yr	Mild	Harsh	No (1)	M	I	
7	VRS-MOD-002A	Motor Operated Damper	R/B	7	ESF	1yr	Mild	Harsh	No (1)	M	I	
8	VRS-MOD-002B	Motor Operated Damper	R/B	7	ESF	1yr	Mild	Harsh	No (1)	M	I	
9	VRS-MOD-003A	Motor Operated Damper	R/B	7	ESF	1yr	Mild	Harsh	No (1)	M	I	
10	VRS-MOD-003B	Motor Operated Damper	R/B	7	ESF	1yr	Mild	Harsh	No (1)	M	I	
11	VRS-RAH-201A	A-Class 1E Electrical Room Air Handling Unit	R/B	8	ESF	1yr	Mild	Harsh	No (1)	M	I	
12	VRS-RAH-201B	B-Class 1E Electrical Room Air Handling Unit	R/B	8	ESF	1yr	Mild	Harsh	No (1)	M	I	
13	VRS-RAH-201C	C-Class 1E Electrical Room Air Handling Unit	R/B	8	ESF	1yr	Mild	Harsh	No (1)	M	I	
14	VRS-RAH-201D	D-Class 1E Electrical Room Air Handling Unit	R/B	8	ESF	1yr	Mild	Harsh	No (1)	M	I	
15	VRS-RFN-201A	A-Class 1E Electrical Room Air Handling Unit Fan	R/B	8	ESF	1yr	Mild	Harsh	No (1)	M	I	
16	VRS-RFN-201B	B-Class 1E Electrical Room Air Handling Unit Fan	R/B	8	ESF	1yr	Mild	Harsh	No (1)	M	I	
17	VRS-RFN-201C	C-Class 1E Electrical Room Air Handling Unit Fan	R/B	8	ESF	1yr	Mild	Harsh	No (1)	M	I	
18	VRS-RFN-201D	D-Class 1E Electrical Room Air Handling Unit Fan	R/B	8	ESF	1yr	Mild	Harsh	No (1)	M	I	
19	VRS-RFN-202A	A-Class 1E Electrical Room Return Air Fan	R/B	8	ESF	1yr	Mild	Harsh	No (1)	M	I	

Table 3D-2 US-APWR Environmental Qualification Equipment List
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Item Num	Equipment Tag	Description	Location (~~PCCV, R/B, A/B, O/B,T/B, UHSRS~~)		Purpose	Operational Duration	Environmental Conditions	Radiation Condition	Influence of Submergence for Total Integrated Dose	Qualification Process	Seismic Category	Comments
			Building	Zone	RT, ESF, PAM, Paressure Boundary (PB), Other		Harsh or Mild	Harsh or Mild	Yes/No	E=Electrical M=Mechanical	I, II, Non	
20	VRS-RFN-202B	B-Class 1E Electrical Room Return Air Fan	R/B	8	ESF	1yr	Mild	Harsh	No (1)	M	I	
21	VRS-RFN-202C	C-Class 1E Electrical Room Return Air Fan	R/B	8	ESF	1yr	Mild	Harsh	No (1)	M	I	
22	VRS-RFN-202D	D-Class 1E Electrical Room Return Air Fan	R/B	8	ESF	1yr	Mild	Harsh	No (1)	M	I	
23	VRS-RCC-201A	A-Class 1E Electrical Room Air Handling Unit Cooling Coil	R/B	8	ESF	1yr	Mild	Harsh	No (1)	M	I	
24	VRS-RCC-201B	B-Class 1E Electrical Room Air Handling Unit Cooling Coil	R/B	8	ESF	1yr	Mild	Harsh	No (1)	M	I	
25	VRS-RCC-201C	C-Class 1E Electrical Room Air Handling Unit Cooling Coil	R/B	8	ESF	1yr	Mild	Harsh	No (1)	M	I	
26	VRS-RCC-201D	D-Class 1E Electrical Room Air Handling Unit Cooling Coil	R/B	8	ESF	1yr	Mild	Harsh	No (1)	M	I	
27	VRS-REH-201A	A-Class 1E Electrical Room Air Handling Unit Electric Heating Coil	R/B	8	ESF	1yr	Mild	Harsh	No (1)	M	I	
28	VRS-REH-201B	B-Class 1E Electrical Room Air Handling Unit Electric Heating Coil	R/B	8	ESF	1yr	Mild	Harsh	No (1)	M	I	
29	VRS-REH-201C	C-Class 1E Electrical Room Air Handling Unit Electric Heating Coil	R/B	8	ESF	1yr	Mild	Harsh	No (1)	M	I	
30	VRS-REH-201D	D-Class 1E Electrical Room Air Handling Unit Electric Heating Coil	R/B	8	ESF	1yr	Mild	Harsh	No (1)	M	I	
31	VRS-MOD-201A	Motor Operated Damper	R/B	8	ESF	1yr	Mild	Harsh	No (1)	M	I	
32	VRS-MOD-201B	Motor Operated Damper	R/B	8	ESF	1yr	Mild	Harsh	No (1)	M	I	
33	VRS-MOD-201C	Motor Operated Damper	R/B	8	ESF	1yr	Mild	Harsh	No (1)	M	I	
34	VRS-MOD-201D	Motor Operated Damper	R/B	8	ESF	1yr	Mild	Harsh	No (1)	M	I	
35	VRS-MOD-202A	Motor Operated Damper	R/B	8	ESF	1yr	Mild	Harsh	No (1)	M	I	
36	VRS-MOD-202B	Motor Operated Damper	R/B	8	ESF	1yr	Mild	Harsh	No (1)	M	I	
37	VRS-MOD-202C	Motor Operated Damper	R/B	8	ESF	1yr	Mild	Harsh	No (1)	M	I	
38	VRS-MOD-202D	Motor Operated Damper	R/B	8	ESF	1yr	Mild	Harsh	No (1)	M	I	
39	VRS-MOD-203A	Motor Operated Damper	R/B	8	ESF	1yr	Mild	Harsh	No (1)	M	I	
40	VRS-MOD-203B	Motor Operated Damper	R/B	8	ESF	1yr	Mild	Harsh	No (1)	M	I	

Table 3D-2 US-APWR Environmental Qualification Equipment List
(Sheet 52 of 64)

Item Num	Equipment Tag	Description	Location (~~PCCV, R/B, A/B, O/B, T/B, UHSRS~~)		Purpose	Operational Duration	Environmental Conditions	Radiation Condition	Influence of Submergence for Total Integrated Dose	Qualification Process	Seismic Category	Comments
			Building	Zone	RT, ESF, PAM, Paressure Boundary (PB), Other		Harsh or Mild	Harsh or Mild	Yes/No	E=Electrical M=Mechanical	I, II, Non	
41	VRS-MOD-203C	Motor Operated Damper	R/B	8	ESF	1yr	Mild	Harsh	No (1)	M	I	
42	VRS-MOD-203D	Motor Operated Damper	R/B	8	ESF	1yr	Mild	Harsh	No (1)	M	I	
43	VRS-MOD-204A	Motor Operated Damper	R/B	8	ESF	1yr	Mild	Harsh	No (1)	M	I	
44	VRS-MOD-204B	Motor Operated Damper	R/B	8	ESF	1yr	Mild	Harsh	No (1)	M	I	
45	VRS-MOD-204C	Motor Operated Damper	R/B	8	ESF	1yr	Mild	Harsh	No (1)	M	I	
46	VRS-MOD-204D	Motor Operated Damper	R/B	8	ESF	1yr	Mild	Harsh	No (1)	M	I	
47	VRS-AOD-205A	Air Operated Damper	R/B	8	ESF	5min	Mild	Mild	No (1)	M	I	
48	VRS-AOD-205B	Air Operated Damper	R/B	8	ESF	5min	Mild	Mild	No (1)	M	I	
49	VRS-AOD-205C	Air Operated Damper	R/B	8	ESF	5min	Mild	Mild	No (1)	M	I	
50	VRS-AOD-205D	Air Operated Damper	R/B	8	ESF	5min	Mild	Mild	No (1)	M	I	
51	VRS-RFN-251A	A-Class 1E Battery Room Exhaust Fan	~~R/B~~ PS/B	11	ESF	1yr	Mild	Mild	No (1)	M	I	
52	VRS-RFN-251B	B-Class 1E Battery Room Exhaust Fan	~~R/B~~ PS/B	11	ESF	1yr	Mild	Mild	No (1)	M	I	
53	VRS-RFN-251C	C-Class 1E Battery Room Exhaust Fan	~~R/B~~ PS/B	11	ESF	1yr	Mild	Mild	No (1)	M	I	
54	VRS-RFN-251D	D-Class 1E Battery Room Exhaust Fan	~~R/B~~ PS/B	11	ESF	1yr	Mild	Mild	No (1)	M	I	
55	VRS-MOD-251A	Motor Operated Damper	~~R/B~~ PS/B	11	ESF	1yr	Mild	Mild	No (1)	M	I	
56	VRS-MOD-251B	Motor Operated Damper	~~R/B~~ PS/B	11	ESF	1yr	Mild	Mild	No (1)	M	I	
57	VRS-MOD-251C	Motor Operated Damper	~~R/B~~ PS/B	11	ESF	1yr	Mild	Mild	No (1)	M	I	
58	VRS-MOD-251D	Motor Operated Damper	~~R/B~~ PS/B	11	ESF	1yr	Mild	Mild	No (1)	M	I	
59	VRS-MOD-252A	Motor Operated Damper	~~R/B~~ PS/B	11	ESF	1yr	Mild	Mild	No (1)	M	I	
60	VRS-MOD-252B	Motor Operated Damper	~~R/B~~ PS/B	11	ESF	1yr	Mild	Mild	No (1)	M	I	
61	VRS-MOD-252C	Motor Operated Damper	~~R/B~~ PS/B	11	ESF	1yr	Mild	Mild	No (1)	M	I	
62	VRS-MOD-252D	Motor Operated Damper	~~R/B~~ PS/B	11	ESF	1yr	Mild	Mild	No (1)	M	I	

Table 3D-2 US-APWR Environmental Qualification Equipment List
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Item Num	Equipment Tag	Description	Location (~~PCCV, R/B, A/B, O/B,T/B, UHSRS~~)		Purpose	Operational Duration	Environmental Conditions	Radiation Condition	Influence of Submergence for Total Integrated Dose	Qualification Process	Seismic Category	Comments
			Building	Zone	RT, ESF, PAM, Paressure Boundary (PB), Other		Harsh or Mild	Harsh or Mild	Yes/No	E=Electrical M=Mechanical	I, II, Non	
63	VRS-RAH-301A	A-Safeguard Component Area Air Handling Unit	R/B	6	ESF	1yr	Mild	Harsh	No (1)	M	I	
64	VRS-RAH-301B	B-Safeguard Component Area Air Handling Unit	R/B	6	ESF	1yr	Mild	Harsh	No (1)	M	I	
65	VRS-RAH-301C	C-Safeguard Component Area Air Handling Unit	R/B	6	ESF	1yr	Mild	Harsh	No (1)	M	I	
66	VRS-RAH-301D	D-Safeguard Component Area Air Handling Unit	R/B	6	ESF	1yr	Mild	Harsh	No (1)	M	I	
67	VRS-RFN-301A	A-Safeguard Component Area Air Handling Unit Fan	R/B	6	ESF	1yr	Mild	Harsh	No (1)	M	I	
68	VRS-RFN-301B	B-Safeguard Component Area Air Handling Unit Fan	R/B	6	ESF	1yr	Mild	Harsh	No (1)	M	I	
69	VRS-RFN-301C	C-Safeguard Component Area Air Handling Unit Fan	R/B	6	ESF	1yr	Mild	Harsh	No (1)	M	I	
70	VRS-RFN-301D	D-Safeguard Component Area Air Handling Unit Fan	R/B	6	ESF	1yr	Mild	Harsh	No (1)	M	I	
71	VRS-RCC-301A	A-Safeguard Component Area Air Handling Unit Cooling Coil	R/B	6	ESF	1yr	Mild	Harsh	No (1)	M	I	
72	VRS-RCC-301B	B-Safeguard Component Area Air Handling Unit Cooling Coil	R/B	6	ESF	1yr	Mild	Harsh	No (1)	M	I	
73	VRS-RCC-301C	C-Safeguard Component Area Air Handling Unit Cooling Coil	R/B	6	ESF	1yr	Mild	Harsh	No (1)	M	I	
74	VRS-RCC-301D	D-Safeguard Component Area Air Handling Unit Cooling Coil	R/B	6	ESF	1yr	Mild	Harsh	No (1)	M	I	
75	VRS-REH-301A	A-Safeguard Component Area Air Handling Unit Electric Heating Coil	R/B	6	ESF	1yr	Mild	Harsh	No (1)	M	I	
76	VRS-REH-301B	B-Safeguard Component Area Air Handling Unit Electric Heating Coil	R/B	6	ESF	1yr	Mild	Harsh	No (1)	M	I	
77	VRS-REH-301C	C-Safeguard Component Area Air Handling Unit Electric Heating Coil	R/B	6	ESF	1yr	Mild	Harsh	No (1)	M	I	
78	VRS-REH-301D	D-Safeguard Component Area Air Handling Unit Electric Heating Coil	R/B	6	ESF	1yr	Mild	Harsh	No (1)	M	I	
79	VRS-MOD-301A	Motor Operated Damper	R/B	6	ESF	1yr	Mild	Harsh	No (1)	M	I	
80	VRS-MOD-301B	Motor Operated Damper	R/B	6	ESF	1yr	Mild	Harsh	No (1)	M	I	
81	VRS-MOD-301C	Motor Operated Damper	R/B	6	ESF	1yr	Mild	Harsh	No (1)	M	I	

Table 3D-2 US-APWR Environmental Qualification Equipment List
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Item Num	Equipment Tag	Description	Location (~~PCCV, R/B, A/B, O/B,T/B, UHSRS~~)		Purpose	Operational Duration	Environmental Conditions	Radiation Condition	Influence of Submergence for Total Integrated Dose	Qualification Process	Seismic Category	Comments
			Building	Zone	RT, ESF, PAM, Paressure Boundary (PB), Other		Harsh or Mild	Harsh or Mild	Yes/No	E=Electrical M=Mechanical	I, II, Non	
82	VRS-MOD-301D	Motor Operated Damper	R/B	6	ESF	1yr	Mild	Harsh	No (1)	M	I	
83	VRS-MOD-302A	Motor Operated Damper	R/B	6	ESF	1yr	Mild	Harsh	No (1)	M	I	
84	VRS-MOD-302B	Motor Operated Damper	R/B	6	ESF	1yr	Mild	Harsh	No (1)	M	I	
85	VRS-MOD-302C	Motor Operated Damper	R/B	6	ESF	1yr	Mild	Harsh	No (1)	M	I	
86	VRS-MOD-302D	Motor Operated Damper	R/B	6	ESF	1yr	Mild	Harsh	No (1)	M	I	
87	VRS-RAH-401A	A-Emergency Feedwater Pump Area Air Handling Unit	R/B	8	ESF	1yr	Mild	Harsh	No (1)	M	I	
88	VRS-RAH-401B	B-Emergency Feedwater Pump Area Air Handling Unit	R/B	8	ESF	1yr	Mild	Harsh	No (1)	M	I	
89	VRS-RAH-401C	C-Emergency Feedwater Pump Area Air Handling Unit	R/B	8	ESF	1yr	Mild	Harsh	No (1)	M	I	
90	VRS-RAH-401D	D-Emergency Feedwater Pump Area Air Handling Unit	R/B	8	ESF	1yr	Mild	Harsh	No (1)	M	I	
91	VRS-RFN-401A	A-Emergency Feedwater Pump Area Air Handling Unit Fan	R/B	8	ESF	1yr	Mild	Harsh	No (1)	M	I	
92	VRS-RFN-401B	B-Emergency Feedwater Pump Area Air Handling Unit Fan	R/B	8	ESF	1yr	Mild	Harsh	No (1)	M	I	
93	VRS-RFN-401C	C-Emergency Feedwater Pump Area Air Handling Unit Fan	R/B	8	ESF	1yr	Mild	Harsh	No (1)	M	I	
94	VRS-RFN-401D	D-Emergency Feedwater Pump Area Air Handling Unit Fan	R/B	8	ESF	1yr	Mild	Harsh	No (1)	M	I	
95	VRS-RCC-401A	A-Emergency Feedwater Pump Area Air Handling Unit Cooling Coil	R/B	8	ESF	1yr	Mild	Harsh	No (1)	M	I	
96	VRS-RCC-401B	B-Emergency Feedwater Pump Area Air Handling Unit Cooling Coil	R/B	8	ESF	1yr	Mild	Harsh	No (1)	M	I	
97	VRS-RCC-401C	C-Emergency Feedwater Pump Area Air Handling Unit Cooling Coil	R/B	8	ESF	1yr	Mild	Harsh	No (1)	M	I	
98	VRS-RCC-401D	D-Emergency Feedwater Pump Area Air Handling Unit Cooling Coil	R/B	8	ESF	1yr	Mild	Harsh	No (1)	M	I	

Table 3D-2 US-APWR Environmental Qualification Equipment List
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Item Num	Equipment Tag	Description	Location (~~PCCV, R/B, A/B, O/B,T/B, UHSRS~~)		Purpose	Operational Duration	Environmental Conditions	Radiation Condition	Influence of Submergence for Total Integrated Dose	Qualification Process	Seismic Category	Comments
			Building	Zone	RT, ESF, PAM, Paressure Boundary (PB), Other		Harsh or Mild	Harsh or Mild	Yes/No	E=Electrical M=Mechanical	I, II, Non	
99	VRS-REH-401A	A-Emergency Feedwater Pump Area Air Handling Unit Electric Heating Coil	R/B	8	ESF	1yr	Mild	Harsh	No (1)	M	I	
100	VRS-REH-401B	B-Emergency Feedwater Pump Area Air Handling Unit Electric Heating Coil	R/B	8	ESF	1yr	Mild	Harsh	No (1)	M	I	
101	VRS-REH-401C	C-Emergency Feedwater Pump Area Air Handling Unit Electric Heating Coil	R/B	8	ESF	1yr	Mild	Harsh	No (1)	M	I	
102	VRS-REH-401D	D-Emergency Feedwater Pump Area Air Handling Unit Electric Heating Coil	R/B	8	ESF	1yr	Mild	Harsh	No (1)	M	I	
103	VRS-RAH-501A	A-Component Cooling Water Pump Area Air Handling Unit	R/B	8	ESF	1yr	Mild	Harsh	No (1)	M	I	
104	VRS-RAH-501B	B-Component Cooling Water Pump Area Air Handling Unit	R/B	8	ESF	1yr	Mild	Harsh	No (1)	M	I	
105	VRS-RAH-501C	C-Component Cooling Water Pump Area Air Handling Unit	R/B	8	ESF	1yr	Mild	Harsh	No (1)	M	I	
106	VRS-RAH-501D	D-Component Cooling Water Pump Area Air Handling Unit	R/B	8	ESF	1yr	Mild	Harsh	No (1)	M	I	
107	VRS-RFN-501A	A-Component Cooling Water Pump Area Air Handling Unit Fan	R/B	8	ESF	1yr	Mild	Harsh	No (1)	M	I	
108	VRS-RFN-501B	B-Component Cooling Water Pump Area Air Handling Unit Fan	R/B	8	ESF	1yr	Mild	Harsh	No (1)	M	I	
109	VRS-RFN-501C	C-Component Cooling Water Pump Area Air Handling Unit Fan	R/B	8	ESF	1yr	Mild	Harsh	No (1)	M	I	
110	VRS-RFN-501D	D-Component Cooling Water Pump Area Air Handling Unit Fan	R/B	8	ESF	1yr	Mild	Harsh	No (1)	M	I	
111	VRS-RCC-501A	A-Component Cooling Water Pump Area Air Handling Unit Cooling Coil	R/B	8	ESF	1yr	Mild	Harsh	No (1)	M	I	
112	VRS-RCC-501B	B-Component Cooling Water Pump Area Air Handling Unit Cooling Coil	R/B	8	ESF	1yr	Mild	Harsh	No (1)	M	I	

Table 3D-2 US-APWR Environmental Qualification Equipment List
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Item Num	Equipment Tag	Description	Location (~~PCCV, R/B, A/B, O/B,T/B, UHSRS~~)		Purpose	Operational Duration	Environmental Conditions	Radiation Condition	Influence of Submergence for Total Integrated Dose	Qualification Process	Seismic Category	Comments
			Building	Zone	RT, ESF, PAM, Paressure Boundary (PB), Other		Harsh or Mild	Harsh or Mild	Yes/No	E=Electrical M=Mechanical	I, II, Non	
113	VRS-RCC-501C	C-Component Cooling Water Pump Area Air Handling Unit Cooling Coil	R/B	8	ESF	1yr	Mild	Harsh	No (1)	M	I	
114	VRS-RCC-501D	D-Component Cooling Water Pump Area Air Handling Unit Cooling Coil	R/B	8	ESF	1yr	Mild	Harsh	No (1)	M	I	
115	VRS-REH-501A	A-Component Cooling Water Pump Area Air Handling Unit Electric Heating Coil	R/B	8	ESF	1yr	Mild	Harsh	No (1)	M	I	
116	VRS-REH-501B	B-Component Cooling Water Pump Area Air Handling Unit Electric Heating Coil	R/B	8	ESF	1yr	Mild	Harsh	No (1)	M	I	
117	VRS-REH-501C	C-Component Cooling Water Pump Area Air Handling Unit Electric Heating Coil	R/B	8	ESF	1yr	Mild	Harsh	No (1)	M	I	
118	VRS-REH-501D	D-Component Cooling Water Pump Area Air Handling Unit Electric Heating Coil	R/B	8	ESF	1yr	Mild	Harsh	No (1)	M	I	
119	VRS-PAH-511A	A-Essential Chiller Unit Area Air Handling Unit	PS/B	9	ESF	1yr	Mild	Mild	No (1)	M	I	
120	VRS-PAH-511B	B-Essential Chiller Unit Area Air Handling Unit	PS/B	9	ESF	1yr	Mild	Mild	No (1)	M	I	
121	VRS-PAH-511C	C-Essential Chiller Unit Area Air Handling Unit	PS/B	9	ESF	1yr	Mild	Mild	No (1)	M	I	
122	VRS-PAH-511D	D-Essential Chiller Unit Area Air Handling Unit	PS/B	9	ESF	1yr	Mild	Mild	No (1)	M	I	
123	VRS-PFN-511A	A-Essential Chiller Unit Area Air Handling Unit Fan	PS/B	9	ESF	1yr	Mild	Mild	No (1)	M	I	
124	VRS-PFN-511B	B-Essential Chiller Unit Area Air Handling Unit Fan	PS/B	9	ESF	1yr	Mild	Mild	No (1)	M	I	
125	VRS-PFN-511C	C-Essential Chiller Unit Area Air Handling Unit Fan	PS/B	9	ESF	1yr	Mild	Mild	No (1)	M	I	
126	VRS-PFN-511D	D-Essential Chiller Unit Area Air Handling Unit Fan	PS/B	9	ESF	1yr	Mild	Mild	No (1)	M	I	
127	VRS-PCC-511A	A-Essential Chiller Unit Area Air Handling Unit Cooling Coil	PS/B	9	ESF	1yr	Mild	Mild	No (1)	M	I	

Table 3D-2 US-APWR Environmental Qualification Equipment List
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Item Num	Equipment Tag	Description	Location (~~PCCV, R/B, A/B, O/B,T/B, UHSRS~~)		Purpose	Operational Duration	Environmental Conditions	Radiation Condition	Influence of Submergence for Total Integrated Dose	Qualification Process	Seismic Category	Comments
			Building	Zone	RT, ESF, PAM, Paressure Boundary (PB), Other		Harsh or Mild	Harsh or Mild	Yes/No	E=Electrical M=Mechanical	I, II, Non	
128	VRS-PCC-511B	B-Essential Chiller Unit Area Air Handling Unit Cooling Coil	PS/B	9	ESF	1yr	Mild	Mild	No (1)	M	I	
129	VRS-PCC-511C	C-Essential Chiller Unit Area Air Handling Unit Cooling Coil	PS/B	9	ESF	1yr	Mild	Mild	No (1)	M	I	
130	VRS-PCC-511D	D-Essential Chiller Unit Area Air Handling Unit Cooling Coil	PS/B	9	ESF	1yr	Mild	Mild	No (1)	M	I	
131	VRS-PEH-511A	A-Essential Chiller Unit Area Air Handling Unit Electric Heating Coil	PS/B	9	ESF	1yr	Mild	Mild	No (1)	M	I	
132	VRS-PEH-511B	B-Essential Chiller Unit Area Air Handling Unit Electric Heating Coil	PS/B	9	ESF	1yr	Mild	Mild	No (1)	M	I	
133	VRS-PEH-511C	C-Essential Chiller Unit Area Air Handling Unit Electric Heating Coil	PS/B	9	ESF	1yr	Mild	Mild	No (1)	M	I	
134	VRS-PEH-511D	D-Essential Chiller Unit Area Air Handling Unit Electric Heating Coil	PS/B	9	ESF	1yr	Mild	Mild	No (1)	M	I	
135	VRS-RAH-531A	A-Charging Pump Area Air Handling Unit	R/B	7	ESF	1yr	Mild	Harsh	No (1)	M	I	
136	VRS-RAH-531B	B-Charging Pump Area Air Handling Unit	R/B	7	ESF	1yr	Mild	Harsh	No (1)	M	I	
137	VRS-RFN-531A	A-Charging Pump Area Air Handling Unit Fan	R/B	7	ESF	1yr	Mild	Harsh	No (1)	M	I	
138	VRS-RFN-531B	B-Charging Pump Area Air Handling Unit Fan	R/B	7	ESF	1yr	Mild	Harsh	No (1)	M	I	
139	VRS-RCC-531A	A-Charging Pump Area Air Handling Unit Cooling Coil	R/B	7	ESF	1yr	Mild	Harsh	No (1)	M	I	
140	VRS-RCC-531B	B-Charging Pump Area Air Handling Unit Cooling Coil	R/B	7	ESF	1yr	Mild	Harsh	No (1)	M	I	
141	(Deleted)											
142	(Deleted)											
143	VRS-REH-531A	A-Charging Pump Area Air Handling Unit Electric Heating Coil	R/B	7	ESF	1yr	Mild	Harsh	No (1)	M	I	
144	VRS-REH-531B	B-Charging Pump Area Air Handling Unit Electric Heating Coil	R/B	7	ESF	1yr	Mild	Harsh	No (1)	M	I	

Table 3D-2 US-APWR Environmental Qualification Equipment List
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Item Num	Equipment Tag	Description	Location (~~PCCV, R/B, A/B, O/B,T/B, UHSRS~~)		Purpose	Operational Duration	Environmental Conditions	Radiation Condition	Influence of Submergence for Total Integrated Dose	Qualification Process	Seismic Category	Comments
			Building	Zone	RT, ESF, PAM, Paressure Boundary (PB), Other		Harsh or Mild	Harsh or Mild	Yes/No	E=Electrical M=Mechanical	I, II, Non	
145	VRS-RAH-541A	A-Annulus Emergency Exhaust Filtration Unit Area Air Handling Unit	R/B	7	ESF	1yr	Mild	Harsh	No (1)	M	I	
146	VRS-RAH-541B	B-Annulus Emergency Exhaust Filtration Unit Area Air Handling Unit	R/B	7	ESF	1yr	Mild	Harsh	No (1)	M	I	
147	VRS-RFN-541A	A-Annulus Emergency Exhaust Filtration Unit Area Air Handling Unit Fan	R/B	7	ESF	1yr	Mild	Harsh	No (1)	M	I	
148	VRS-RFN-541B	B-Annulus Emergency Exhaust Filtration Unit Area Air Handling Unit Fan	R/B	7	ESF	1yr	Mild	Harsh	No (1)	M	I	
149	VRS-RCC-541A	A-Annulus Emergency Exhaust Filtration Unit Area Air Handling Unit Cooling Coil	R/B	7	ESF	1yr	Mild	Harsh	No (1)	M	I	
150	VRS-RCC-541B	A-Annulus Emergency Exhaust Filtration Unit Area Air Handling Unit Cooling Coil	R/B	7	ESF	1yr	Mild	Harsh	No (1)	M	I	
151	VRS-RCC-541C	B-Annulus Emergency Exhaust Filtration Unit Area Air Handling Unit Cooling Coil	R/B	7	ESF	1yr	Mild	Harsh	No (1)	M	I	
152	VRS-RCC-541D	B-Annulus Emergency Exhaust Filtration Unit Area Air Handling Unit Cooling Coil	R/B	7	ESF	1yr	Mild	Harsh	No (1)	M	I	
153	VRS-REH-541A	A-Annulus Emergency Exhaust Filtration Unit Area Air Handling Unit Electric Heating Coil	R/B	7	ESF	1yr	Mild	Harsh	No (1)	M	I	
154	VRS-REH-541B	B-Annulus Emergency Exhaust Filtration Unit Area Air Handling Unit Electric Heating Coil	R/B	7	ESF	1yr	Mild	Harsh	No (1)	M	I	
155	VRS-RAH-551A	A-Penetration Area Air Handling Unit	R/B	6	ESF	1yr	Mild	Harsh	No (1)	M	I	
156	VRS-RAH-551B	B-Penetration Area Air Handling Unit	R/B	6	ESF	1yr	Mild	Harsh	No (1)	M	I	
157	VRS-RAH-551C	C-Penetration Area Air Handling Unit	R/B	6	ESF	1yr	Mild	Harsh	No (1)	M	I	

Table 3D-2 US-APWR Environmental Qualification Equipment List
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Item Num	Equipment Tag	Description	Location (~~PCCV, R/B, A/B, O/B,T/B, UHSRS~~)		Purpose	Operational Duration	Environmental Conditions	Radiation Condition	Influence of Submergence for Total Integrated Dose	Qualification Process	Seismic Category	Comments
			Building	Zone	RT, ESF, PAM, Paressure Boundary (PB), Other		Harsh or Mild	Harsh or Mild	Yes/No	E=Electrical M=Mechanical	I, II, Non	
158	VRS-RAH-551D	D-Penetration Area Air Handling Unit	R/B	6	ESF	1yr	Mild	Harsh	No (1)	M	I	
159	VRS-RFN-551A	A-Penetration Area Air Handling Unit Fan	R/B	6	ESF	1yr	Mild	Harsh	No (1)	M	I	
160	VRS-RFN-551B	B-Penetration Area Air Handling Unit Fan	R/B	6	ESF	1yr	Mild	Harsh	No (1)	M	I	
161	VRS-RFN-551C	C-Penetration Area Air Handling Unit Fan	R/B	6	ESF	1yr	Mild	Harsh	No (1)	M	I	
162	VRS-RFN-551D	D-Penetration Area Air Handling Unit Fan	R/B	6	ESF	1yr	Mild	Harsh	No (1)	M	I	
163	VRS-RCC-551A	A-Penetration Area Air Handling Unit Cooling Coil	R/B	6	ESF	1yr	Mild	Harsh	No (1)	M	I	
164	VRS-RCC-551B	B-Penetration Area Air Handling Unit Cooling Coil	R/B	6	ESF	1yr	Mild	Harsh	No (1)	M	I	
165	VRS-RCC-551C	C-Penetration Area Air Handling Unit Cooling Coil	R/B	6	ESF	1yr	Mild	Harsh	No (1)	M	I	
166	VRS-RCC-551D	D-Penetration Area Air Handling Unit Cooling Coil	R/B	6	ESF	1yr	Mild	Harsh	No (1)	M	I	
167	VRS-REH-551A	A-Penetration Area Air Handling Unit Electric Heating Coil	R/B	6	ESF	1yr	Mild	Harsh	No (1)	M	I	
168	VRS-REH-551B	B-Penetration Area Air Handling Unit Electric Heating Coil	R/B	6	ESF	1yr	Mild	Harsh	No (1)	M	I	
169	VRS-REH-551C	C-Penetration Area Air Handling Unit Electric Heating Coil	R/B	6	ESF	1yr	Mild	Harsh	No (1)	M	I	
170	VRS-REH-551D	D-Penetration Area Air Handling Unit Electric Heating Coil	R/B	6	ESF	1yr	Mild	Harsh	No (1)	M	I	
Equipment (Containment Ventilation System)												
1	VCS-AOV-304	Air Operated Valve	R/B	6	ESF	5min	Mild	Harsh	No (1)	M	I	
2	VCS-AOV-305	Air Operated Valve	PCCV	1-6	ESF	5min	Harsh	Harsh	No (1)	M	I	
3	VCS-AOV-306	Air Operated Valve	PCCV	1-6	ESF	5min	Harsh	Harsh	No (1)	M	I	
4	VCS-AOV-307	Air Operated Valve	R/B	6	ESF	5min	Mild	Harsh	No (1)	M	I	
5	VCS-AOV-354	Air Operated Valve	R/B	6	ESF	5min	Mild	Harsh	No (1)	M	I	
6	VCS-AOV-355	Air Operated Valve	PCCV	1-6	ESF	5min	Harsh	Harsh	No (1)	M	I	

Table 3D-2 US-APWR Environmental Qualification Equipment List
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Item Num	Equipment Tag	Description	Location (~~PCCV, R/B, A/B, O/B,T/B, UHSRS~~)		Purpose	Operational Duration	Environmental Conditions	Radiation Condition	Influence of Submergence for Total Integrated Dose	Qualification Process	Seismic Category	Comments
			Building	Zone	RT, ESF, PAM, Paressure Boundary (PB), Other		Harsh or Mild	Harsh or Mild	Yes/No	E=Electrical M=Mechanical	I, II, Non	
7	VCS-AOV-356	Air Operated Valve	PCCV	1-6	ESF	5min	Harsh	Harsh	No (1)	M	I	
8	VCS-AOV-357	Air Operated Valve	R/B	6	ESF	5min	Mild	Harsh	No (1)	M	I	
Equipment (Auxiliary Building Ventilation System)												
1	VAS-AOD-501A	Air Operated Damper	R/B	13-3	ESF	5min	Mild	Harsh	No (1)	M	I	
2	VAS-AOD-501B	Air Operated Damper	R/B	13-3	ESF	5min	Mild	Harsh	No (1)	M	I	
3	VAS-AOD-502A	Air Operated Damper	R/B	6	ESF	5min	Mild	Harsh	No (1)	M	I	
4	VAS-AOD-502B	Air Operated Damper	R/B	6	ESF	5min	Mild	Harsh	No (1)	M	I	
5	VAS-AOD-503A	Air Operated Damper	R/B	6	ESF	5min	Mild	Harsh	No (1)	M	I	
6	VAS-AOD-503B	Air Operated Damper	R/B	6	ESF	5min	Mild	Harsh	No (1)	M	I	
7	VAS-AOD-504A	Air Operated Damper	R/B	13-3	ESF	5min	Mild	Harsh	No (1)	M	I	
8	VAS-AOD-504B	Air Operated Damper	R/B	13-3	ESF	5min	Mild	Harsh	No (1)	M	I	
9	VAS-AOD-505A	Air Operated Damper	R/B	13-3	ESF	5min	Mild	Harsh	No (1)	M	I	
10	VAS-AOD-505B	Air Operated Damper	R/B	13-3	ESF	5min	Mild	Harsh	No (1)	M	I	
11	VAS-AOD-505C	Air Operated Damper	R/B	13-3	ESF	5min	Mild	Harsh	No (1)	M	I	
12	VAS-AOD-505D	Air Operated Damper	R/B	13-3	ESF	5min	Mild	Harsh	No (1)	M	I	
13	VAS-AOD-506A	Air Operated Damper	R/B	6	ESF	5min	Mild	Harsh	No (1)	M	I	
14	VAS-AOD-506B	Air Operated Damper	R/B	6	ESF	5min	Mild	Harsh	No (1)	M	I	
15	VAS-AOD-506C	Air Operated Damper	R/B	6	ESF	5min	Mild	Harsh	No (1)	M	I	
16	VAS-AOD-506D	Air Operated Damper	R/B	6	ESF	5min	Mild	Harsh	No (1)	M	I	
17	VAS-AOD-507A	Air Operated Damper	R/B	6	ESF	5min	Mild	Harsh	No (1)	M	I	
18	VAS-AOD-507B	Air Operated Damper	R/B	6	ESF	5min	Mild	Harsh	No (1)	M	I	
19	VAS-AOD-507C	Air Operated Damper	R/B	6	ESF	5min	Mild	Harsh	No (1)	M	I	
20	VAS-AOD-507D	Air Operated Damper	R/B	6	ESF	5min	Mild	Harsh	No (1)	M	I	
21	VAS-AOD-508A	Air Operated Damper	R/B	13-3	ESF	5min	Mild	Harsh	No (1)	M	I	

Table 3D-2 US-APWR Environmental Qualification Equipment List
(Sheet 61 of 64)

Item Num	Equipment Tag	Description	Location (~~PCCV, R/B, A/B, O/B,T/B, UHSRS~~)		Purpose	Operational Duration	Environmental Conditions	Radiation Condition	Influence of Submergence for Total Integrated Dose	Qualification Process	Seismic Category	Comments
			Building	Zone	RT, ESF, PAM, Paressure Boundary (PB), Other		Harsh or Mild	Harsh or Mild	Yes/No	E=Electrical M=Mechanical	I, II, Non	
22	VAS-AOD-508B	Air Operated Damper	R/B	13-3	ESF	5min	Mild	Harsh	No (1)	M	I	
23	VAS-AOD-508C	Air Operated Damper	R/B	13-3	ESF	5min	Mild	Harsh	No (1)	M	I	
24	VAS-AOD-508D	Air Operated Damper	R/B	13-3	ESF	5min	Mild	Harsh	No (1)	M	I	
25	VAS-AOD-511	Air Operated Damper	R/B	6	ESF	5min	Mild	Harsh	No (1)	M	I	
26	VAS-AOD-512	Air Operated Damper	R/B	6	ESF	5min	Mild	Harsh	No (1)	M	I	
Equipment (Chilled Water System)												
1	VWS-PEQ-001A	A-Essential Chiller Unit	PS/B	9	ESF	1yr	Mild	Mild	No (1)	M	I	
2	VWS-PEQ-001B	B-Essential Chiller Unit	PS/B	9	ESF	1yr	Mild	Mild	No (1)	M	I	
3	VWS-PEQ-001C	C-Essential Chiller Unit	PS/B	9	ESF	1yr	Mild	Mild	No (1)	M	I	
4	VWS-PEQ-001D	D-Essential Chiller Unit	PS/B	9	ESF	1yr	Mild	Mild	No (1)	M	I	
5	VWS-PPP-001A	A-Essential Chilled Water Pump	PS/B	9	ESF	1yr	Mild	Mild	No (1)	M	I	
6	VWS-PPP-001B	B-Essential Chilled Water Pump	PS/B	9	ESF	1yr	Mild	Mild	No (1)	M	I	
7	VWS-PPP-001C	C-Essential Chilled Water Pump	PS/B	9	ESF	1yr	Mild	Mild	No (1)	M	I	
8	VWS-PPP-001D	D-Essential Chilled Water Pump	PS/B	9	ESF	1yr	Mild	Mild	No (1)	M	I	
9	VWS-PTK-001A	A-Essential Chilled Water Compression Tank	PS/B	9	ESF	1yr	Mild	Mild	No (1)	M	I	
10	VWS-PTK-001B	B-Essential Chilled Water Compression Tank	PS/B	9	ESF	1yr	Mild	Mild	No (1)	M	I	
11	VWS-PTK-001C	C-Essential Chilled Water Compression Tank	PS/B	9	ESF	1yr	Mild	Mild	No (1)	M	I	
12	VWS-PTK-001D	D-Essential Chilled Water Compression Tank	PS/B	9	ESF	1yr	Mild	Mild	No (1)	M	I	
13	VWS-TCV-2845	Chilled Water Control Valve	R/B	8	ESF	1yr	Mild	Harsh	No (1)	M	I	
14	VWS-TCV-2855	Chilled Water Control Valve	R/B	8	ESF	1yr	Mild	Harsh	No (1)	M	I	
15	VWS-TCV-2865	Chilled Water Control Valve	R/B	8	ESF	1yr	Mild	Harsh	No (1)	M	I	
16	VWS-TCV-2875	Chilled Water Control Valve	R/B	8	ESF	1yr	Mild	Harsh	No (1)	M	I	
17	VWS-TCV-2784	Chilled Water Control Valve	R/B	8	ESF	1yr	Mild	Harsh	No (1)	M	I	

Table 3D-2 US-APWR Environmental Qualification Equipment List
(Sheet 62 of 64)

Item Num	Equipment Tag	Description	Location (~~PCCV, R/B, A/B, O/B,T/B, UHSRS~~)		Purpose	Operational Duration	Environmental Conditions	Radiation Condition	Influence of Submergence for Total Integrated Dose	Qualification Process	Seismic Category	Comments
			Building	Zone	RT, ESF, PAM, Paressure Boundary (PB), Other		Harsh or Mild	Harsh or Mild	Yes/No	E=Electrical M=Mechanical	I, II, Non	
18	VWS-TCV-2794	Chilled Water Control Valve	R/B	8	ESF	1yr	Mild	Harsh	No (1)	M	I	
19	VWS-TCV-2804	Chilled Water Control Valve	R/B	8	ESF	1yr	Mild	Harsh	No (1)	M	I	
20	VWS-TCV-2814	Chilled Water Control Valve	R/B	8	ESF	1yr	Mild	Harsh	No (1)	M	I	
21	VWS-TCV-2574	Chilled Water Control Valve	R/B	6	ESF	1yr	Mild	Harsh	No (1)	M	I	
22	VWS-TCV-2584	Chilled Water Control Valve	R/B	6	ESF	1yr	Mild	Harsh	No (1)	M	I	
23	VWS-TCV-2594	Chilled Water Control Valve	R/B	6	ESF	1yr	Mild	Harsh	No (1)	M	I	
24	VWS-TCV-2604	Chilled Water Control Valve	R/B	6	ESF	1yr	Mild	Harsh	No (1)	M	I	
25	VWS-TCV-2671	Chilled Water Control Valve	R/B	8	ESF	1yr	Mild	Harsh	No (1)	M	I	
26	VWS-TCV-2676	Chilled Water Control Valve	R/B	8	ESF	1yr	Mild	Harsh	No (1)	M	I	
27	VWS-TCV-2681	Chilled Water Control Valve	R/B	8	ESF	1yr	Mild	Harsh	No (1)	M	I	
28	VWS-TCV-2686	Chilled Water Control Valve	R/B	8	ESF	1yr	Mild	Harsh	No (1)	M	I	
29	VWS-TCV-2721A	Chilled Water Control Valve	R/B	8	ESF	1yr	Mild	Harsh	No (1)	M	I	
30	VWS-TCV-2721B	Chilled Water Control Valve	R/B	8	ESF	1yr	Mild	Harsh	No (1)	M	I	
31	VWS-TCV-2721C	Chilled Water Control Valve	R/B	8	ESF	1yr	Mild	Harsh	No (1)	M	I	
32	VWS-TCV-2721D	Chilled Water Control Valve	R/B	8	ESF	1yr	Mild	Harsh	No (1)	M	I	
33	VWS-TCV-2726A	Chilled Water Control Valve	PS/B	9	ESF	1yr	Mild	Mild	No (1)	M	I	
34	VWS-TCV-2726B	Chilled Water Control Valve	PS/B	9	ESF	1yr	Mild	Mild	No (1)	M	I	
35	VWS-TCV-2726C	Chilled Water Control Valve	PS/B	9	ESF	1yr	Mild	Mild	No (1)	M	I	
36	VWS-TCV-2726D	Chilled Water Control Valve	PS/B	9	ESF	1yr	Mild	Mild	No (1)	M	I	
37	VWS-TCV-2731	Chilled Water Control Valve	R/B	7	ESF	1yr	Mild	Harsh	No (1)	M	I	
38	(Deleted)											
39	(Deleted)											
40	VWS-TCV-2736	Chilled Water Control Valve	R/B	7	ESF	1yr	Mild	Harsh	No (1)	M	I	
41	VWS-TCV-2741A	Chilled Water Control Valve	R/B	7	ESF	1yr	Mild	Harsh	No (1)	M	I	

Table 3D-2 US-APWR Environmental Qualification Equipment List
(Sheet 63 of 64)

Item Num	Equipment Tag	Description	Location (~~PCCV, R/B, A/B, O/B,T/B, UHSRS~~)		Purpose	Operational Duration	Environmental Conditions	Radiation Condition	Influence of Submergence for Total Integrated Dose	Qualification Process	Seismic Category	Comments
			Building	Zone	RT, ESF, PAM, Paressure Boundary (PB), Other		Harsh or Mild	Harsh or Mild	Yes/No	E=Electrical M=Mechanical	I, II, Non	
42	VWS-TCV-2741B	Chilled Water Control Valve	R/B	7	ESF	1yr	Mild	Harsh	No (1)	M	I	
43	VWS-TCV-2746A	Chilled Water Control Valve	R/B	7	ESF	1yr	Mild	Harsh	No (1)	M	I	
44	VWS-TCV-2746B	Chilled Water Control Valve	R/B	7	ESF	1yr	Mild	Harsh	No (1)	M	I	
45	VWS-TCV-2331	Chilled Water Control Valve	R/B	6	ESF	1yr	Mild	Harsh	No (1)	M	I	
46	VWS-TCV-2336	Chilled Water Control Valve	R/B	6	ESF	1yr	Mild	Harsh	No (1)	M	I	
47	VWS-TCV-2341	Chilled Water Control Valve	R/B	6	ESF	1yr	Mild	Harsh	No (1)	M	I	
48	VWS-TCV-2346	Chilled Water Control Valve	R/B	6	ESF	1yr	Mild	Harsh	No (1)	M	I	
49	VWS-MOV-403	Motor Operated Valve	R/B	6	ESF	5min	Mild	Harsh	No (1)	M	I	
50	VWS-MOV-407	Motor Operated Valve	R/B	6	ESF	5min	Mild	Harsh	No (1)	M	I	
51	VWS-VLV-253A	Safety Valve	PS/B	9	ESF	1yr	Mild	Mild	No (1)	M	I	
52	VWS-VLV-253B	Safety Valve	PS/B	9	ESF	1yr	Mild	Mild	No (1)	M	I	
53	VWS-VLV-253C	Safety Valve	PS/B	9	ESF	1yr	Mild	Mild	No (1)	M	I	
54	VWS-VLV-253D	Safety Valve	PS/B	9	ESF	1yr	Mild	Mild	No (1)	M	I	
55	VWS-VLV-405	Safety Valve	PCCV	1-6	ESF	1yr	Harsh	Harsh	No (1)	M	I	
56	VWS-MOV-411A	Motor Operated Valve	PCCV	1-6	PB	1yr	Harsh	Harsh	No (1)	M	I	
57	VWS-MOV-411B	Motor Operated Valve	PCCV	1-6	PB	1yr	Harsh	Harsh	No (1)	M	I	
58	VWS-MOV-411C	Motor Operated Valve	PCCV	1-6	PB	1yr	Harsh	Harsh	No (1)	M	I	
59	VWS-MOV-411D	Motor Operated Valve	PCCV	1-6	PB	1yr	Harsh	Harsh	No (1)	M	I	
60	VWS-TCV-412A	Chilled Water Control Valve	PCCV	1-6	PB	1yr	Harsh	Harsh	No (1)	M	I	
61	VWS-TCV-412B	Chilled Water Control Valve	PCCV	1-6	PB	1yr	Harsh	Harsh	No (1)	M	I	
62	VWS-TCV-412C	Chilled Water Control Valve	PCCV	1-6	PB	1yr	Harsh	Harsh	No (1)	M	I	
63	VWS-TCV-412D	Chilled Water Control Valve	PCCV	1-6	PB	1yr	Harsh	Harsh	No (1)	M	I	
64	VWS-MOV-414	Motor Operated Valve	PCCV	1-6	PB	1yr	Harsh	Harsh	No (1)	M	I	

Table 3D-2 US-APWR Environmental Qualification Equipment List
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Attachment 1
to RAI 358-2462

Notes:

1. Identification number for "Influence of Submergence for Total Integrated Dose"
   (1) Components with no possibility of submergence.
   (2) Components that can be submerged in case of HELB, however these components are not required to assure the safety function (including components with alternativeness).
   (3) Non-safety related components.

Table 3D-3 Location for Zone

Zone	Location
1	Containment
1-1	Reactor Vessel
1-2	Nuclear Instrument System
1-3	Inside Reactor Coolant System
1-4	Inside Secondary Shield (including Regenerative Hx Room)
1-5	Under Operation Floor
1-6	Above Operation Floor (including Refueling Water Storage Pit)
2	MCR and Remote Shutdown Console Room
3	Class 1E I&C Room
4	Class 1E I&C Electrical Room, UPS Room, Battery Charger Room, and Reactor Trip Breaker Room
5	Class 1E Battery Room
6	Penetration Area and Safeguard Component Area (Radiological Area)
7	Safety Related Component Area (Radiological Area)
8	Safety Related Component Area (Non-Radiological Area)
9	Essential Chiller Unit and Pump Room
10	Main Steam/Feedwater Piping Area
11	Gas Turbine Area
12	Fuel Handling Area
13	Reactor Building and Auxiliary Building General Mechanical Area (Radiological Area)
13-1	Auxiliary Building General Mechanical Area
13-2	Reactor Building Sample Heat Exchanger Room
13-3	Reactor Building Passage
14	Reactor Building and Turbine Building General Mechanical Area (Non-Radiological Area)