RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION

APR1400 Design Certification

Korea Electric Power Corporation / Korea Hydro & Nuclear Power Co., LTD

Docket No. 52-046

RAI No.: **232-7864**

SRP Section: **SRP 19**

Application Section: **19.1.**

Date of RAI Issued: **9/30/2015**

Question No. 19-10

10 CFR 52.47(27) requires that a standard design certification applicant provide a description of the design specific PRA and the results. SRP Chapter 19, Revision 3, states "The staff will determine that the applicant has performed a PRA-based SMA to determine the seismic capacity of the plant and for each sequence that may lead to core damage or large release." Thus, the staff requests KHNP to update the DCD Section 19.1.6 to provide a discussion on how the seismic margins approach was applied to low power and shutdown conditions. Specifically, the staff is requesting the applicant to update Section 19.1.6 of the DCD to include the seismic cutsets and the sequence HCLPF capacities. The staff also requests KHNP to update Section 19.1.6 of the DCD to include the dominant mixed cutsets containing seismic failures and random failures or operator actions.

Response

A seismic margin analysis (SMA) for low-power and shutdown (LPSD) conditions was performed. Details of the LPSD SMA are documented in APR1400-K-P-NR-017771-P, Rev. 0, “LPSD Seismic Margin Analysis” and include evaluation of core damage as well as Level 2 sequences. Sequence level cutsets for the various plant operating states (POS) are provided in the documentation, and are used to produce the plant-level HCLPF for Level 1 and Level 2 results. Attachment provides the DCD markups of the LPSD SMA results and summary.

Both at-power and LPSD SMA results reflect the latest PRA model updates.

Impact on DCD

DCD Section 19.1.6 will be revised as discussed above.

Impact on PRA

There is no impact on the PRA.

Impact on Technical Specifications

There is no impact on the Technical Specifications.

Impact on Technical/Topical/Environmental Reports

There is no impact on any Technical, Topical, or Environmental Report.

e. Manual feed and bleed failure is also highly risk significant. For example, a feed and bleed failure in POS 10 alone contributes 21 percent of the total LPSD CDF; therefore, almost all POS 10 CDF (22 percent) includes this HEP. The same HEP is also a significant contributor to all other POS.

f. Containment cooling is assumed to remain a requirement in POS 3A (SC cooldown from 350 °F to 212 °F) because decay heat is still relatively high. In all later POS, decay heat is sufficiently low that containment cooling is not "asked" in the LPSD flooding PRA. As a result of this potential failure mode, the risk results from POS 3A are relatively high.

g. During plant shutdown operation, the integrity of fire and flood barriers between areas in the same division, such as quadrants, where systems making up the alternate shutdown capability are located, should be maintained. A configuration control program should require that, during Modes 4, 5, and 6, the watertight flood doors and fire doors be maintained closed on at least one quadrant (containing either an SC or CS pump) to prevent common mode failures from internal floods or fires; the SC or CS pump in this quadrant shall be operable. If the flood or fire doors to this quadrant must be opened for reasons other than normal ingress/egress, a flood/fire watch should be established for the affected door.

Insert "A"

19.1.7 PRA-Related Input to Other Programs and Processes

The APR1400 is expected to perform better than current operating plants in the area of severe accident safety performance, since prevention and mitigation of severe accidents, as shown in Table 19.1-2 and Table 19.1-3, have been addressed during the design stage, taking advantage of PRA results and severe accident analysis. The PRA results indicate that the APR1400 design has a low level of risk and meets the CDF, LRF, and containment performance goals for new-generation PWRs.

19.1.7.1 PRA Input to Design Programs and Processes

The APR1400 PRA is an integral part of the design process and has been used to optimize the plant design with respect to safety. The PRA models and results have influenced the selection of design features such as four EDGs and battery depletion time extension.

"A" (1/10)

19.1.6.5 Seismic LPSD Risk Evaluation

This subsection describes the seismic risk evaluation including the results of the evaluation. The scope of this analysis is LPSD operation.

19.1.6.5.1 Description of the Seismic Risk Evaluation

The seismic margin method was applied to estimate the seismic margin and accident sequences. The seismic margin for the APR1400 is evaluated by using PRA-based SMA. This methodology satisfies the recommendation of SECY-93-087 (Reference 8) approved by the NRC for a seismic risk evaluation. SMA identifies potential vulnerabilities and demonstrates seismic margins beyond the design basis safe shutdown earthquake (SSE). The LPSD seismic margin for the APR1400 is evaluated by using the PRA-based SMA. This approach is the same as was used for the at-power operation SMA described in section 19.1.5.1.1

a. Selection of review level earthquake

   The selection of the review level earthquake for the LPSD SMA is the same as that for the at-power SMA as described in section 19.1.5.1.1 (a).

b. Development of the seismic equipment list

   The seismic equipment list is developed from the at-power SEL. See section 19.1.5.1.1.1(b) for at-power SEL methodology.

c. Identification of seismic initiating event category

   Initiating events due to a seismic event are identified from the internal events LPSD PRA. However, there are some major difference between seismic and internal events for the purpose of identifying the initiating event category as described in section 19.1.5.1.1. (c).

d. Development of system models

   The LPSD SMA models are developed from the internal events LPSD SMA model to include the important accident sequences. This development is identical to that described for at-power SMA in section 19.1.5.1.1 (d).

e. Fragility analysis

   Fragility analysis methodology is identical to that used for at-power SMA as described in section 19.1.5.1.1 (e).

f. Evaluation for the plant seismic capacity

"A" (2/10)

The methodology for evaluation of plant seismic capacity is identical to that used for at-power SMA as described in section 19.1.5.1.1 (f).

g. Demonstration of seismic margin in the design

This step is identical to that used for at-power SMA as described in section 19.1.5.1.1 (f).

19.1.6.5.1.1 Development of the Seismic Equipment List

The seismic equipment list (SEL) provides a documented list of the plant structures, systems, and components (SSCs) that could be used to respond to an earthquake or mitigate potential reactor plant damage initiated by a seismic event. This design certification SEL then is used to develop the SMA systems logic model.

The LPSD SEL was developed from the at-power SMA SEL. See subsection 19.1.5.1.1.1 for development of the at-power SEL. Because all equipment modelled in the LPSD PRA is also modelled in the at-power PRA, use of the at-power SEL provides all needed information. The SEL provides a documented list of the plant SSCs that could be used to respond to an earthquake or mitigate potential reactor plant damage initiated by a seismic event.

While the objectives of the LPSD PRA and PRA-based LPSD SMA are similar, there are differences between the SSCs included in each of the models. Thus, not all SSCs included in the LPSD PRA model are included in the LPSD SEL. For example, some SSCs are not modeled in the LPSD PRA but must be considered in the PRA-based SMA and, therefore, in the SEL. Examples include distribution systems such as piping, cable trays, ventilation ducts, refueling equipment, and structural items such as masonry block walls that could fail and damage nearby safety equipment.

The following additional assumption apply to the LPSD SMA:

a. The ANS/ASME standard (Reference 2) defines a success path for a full power PRA-based SMA as being able to maintain the plant in a safe, stable state for 72 hours following an earthquake and can be used as a guide for equipment that must be included to mitigate seismic accident sequences. The selected systems must enable the plant to be in a safe and stable state at the end of this mission time. Consistent with the full power internal events PRA, the mission time for the LPSD SMA is assumed to be 24 hours except for SSC's required mitigate seismic accident sequences. For SSC's required mitigate seismic accident sequences, the assumed mission time is 72 hours.

b. For the purposes of identifying the plant-level HCLPF in the LPSD SMA, Mode 5 is used in the quantification. POS in Mode 5 consider the largest set of SSCs in mitigation and the set of SSCs considered is very similar to that needed to mitigate core damage or release in other POS and, therefore, is considered representative of the e quipment needed to determine the plant-level HCLPF. During Mode 6, two conditions could occur that are significantly different than Mode 5. The first is when there is a high water level in the reactor cavity which is expected during the majority of time spent in Mode 6. With this

"A" (3/10)

volume of water, it would take a very long time to heat up and boil off enough water to result in loss of core cooling and subsequent core damage thereby presenting less of a challenge to plant equipment and potentially masking components that could be important to determining the plant-level HCLPF. The second condition that is different from Mode 5 is when nozzle dams are installed. As a result, seismic-related insights from quantifying the SMA for Mode 5 are considered representative for all LPSD POS.

c. The large, medium, and small LOCA scenarios are not considered controlling LOCA events for Mode 5 operation. Seismic non-recoverable LOCA (S-NRLOCA) is considered the controlling LOCA accident in Mode 5. A non-recoverable LOCA is the chemical and volume control system (CVCS) letdown line initiating event which represents a loss of RCS inventory that cause an interruption of cooling from the operating SCS train. Any LOCA originating elsewhere in the NSSS would be a lesser LOCA event similar in response and covered by the S-NRLOCA event tree.

d. The containment hatch is assumed to be open for all scenarios in plant operating states (POS) 3B & 4A and closed for all scenarios in POS 4B – 12A. Since the containment hatch is open for all scenarios in POS 3B & 4A all core damage is assumed to go directly to Large Early Release (LER). No level 2 modeling is necessary for POS 3B & 4A level 2 failure since LER is assumed and direct.

e. Seismically-induced failure of nozzle dams may affect the timing of accident response for the LPSD SMA. However, the set of equipment needed to respond to such an event will remain unchanged regardless of whether or not the nozzle dams remain installed. That is, the sequence may change from a loss of shutdown cooling to a non-recoverable LOCA. However, because both types of events are evaluated in the LPSD SMA, the plant-level HCLPF will be correctly determined. Therefore, it is not necessary to explicitly evaluate seismic-induced failure of nozzle dams.

f. The containment structure is assumed to have the same median capacity in shutdown configuration as it does for the full power fragility calculation. That is, collapse of the structure is not affected by whether or not the equipment hatch is removed or installed with four bolts. Additionally, failure of the containment to provide an effective fission product boundary during LPSD conditions when the equipment hatch installed using four bolts has the same fragility as for at-power conditions when the equipment hatch is installed with all bolts

19.1.6.5.1.2 Plant Operating States

For the purposes of identifying the plant-level HCLPF in the LPSD SMA, Mode 5 is used in the quantification. POS in Mode 5 consider the largest set of SSCs in mitigation and the set of SSCs considered is very similar to that needed to mitigate core damage or release in other POS and, therefore, is considered representative of the equipment needed to determine the plant-level HCLPF. During Mode 6, two conditions could occur that are significantly different than Mode 5. The first is when there is a high water level in the reactor cavity which is expected during the majority of time spent in Mode 6. With this volume of water, it would take a very long time to heat up and boil off enough water to result in loss of core cooling and subsequent core damage thereby presenting less of a challenge to plant equipment and potentially masking components that could be important to determining the plant-level HCLPF. The second condition that is different from Mode 5 is when nozzle dams are installed. Seismically-induced failure of nozzle dams is discussed in Assumption 10. As a result, seismic-related insights from quantifying the SMA for Mode 5 are considered representative for all LPSD POS.

"A" (4/10)

The Plant Operating States (POS) listed in table 19.1-41B correlate to Mode 5. These POS will be evaluated for the LPSD SMA. POS 12B is very similar to POS 4A with normal RCS inventory and sub-cooling. However, the thermal-hydraulic analysis shows that the time to core damage is more than 24 hours after a loss of SCS because the decay heat of POS 12B is so low. Therefore, POS 12B has been screened out.

19.1.6.5.1.3 Seismic Fragility Analysis

With the exception of the additional assumptions below, the seismic fragility analysis for the LPSD is the same as that for the at-power SMA. See subsection 19.1.5.1.1.2 for the at-power seismic fragility analysis.

The additional assumptions for the LPSD SMA fragility analysis are as follows:

a. The stresses and loads on the NSSS components are assumed to be higher during full power operation than they are in mode 5. It is assumed that the median capacities calculated for the NSSS components calculated for full power conditions are conservative for plant conditions in mode 5.

b. The Containment structure is assumed to have the same median capacity in shutdown configurations as it does for the full power fragility calculation. That is, collapse of the structure is not affected by whether or not the equipment hatch is removed or installed with four bolts. Additionally, failure of the containment to provide an effective fission product boundary during LPSD conditions when the equipment hatch installed using four bolts has the same fragility as for at-power conditions when the equipment hatch is installed with all bolts.

19.1.6.5.2 Results from the Seismic Risk Evaluation

19.1.6.5.2.1 Seismic Equipment List

The plant has a number of systems that are available for safe shutdown after a seismic event. In selecting the systems, the following potential seismic initiating event scenarios were considered:

a. Loss of offsite power (LOOP)
b. Non-recoverable LOCA
c. Loss of all Instrumentation and Control
d. Direct to core damage scenarios such as building collapse
e. Station Blackout (SBO)

As with other SMAs, the APR1400 LPSD SMA considers equipment needed to supply offsite power to be of very low seismic capacity. If offsite power is available after an earthquake, then the earthquake was relatively mild and such events would cause very little damage. Virtually all of the safety systems would be available for accident mitigation following such a mild event.

"A" (5/10)

The yearly initiating events-Internal events such as loss of a DC or AC bus or loss of cooling water are not considered as seismically-induced initiators. However, the seismic failure and random failure of this equipment is considered after a seismic event.

Table 19.1-41A lists the systems that were evaluated for the LPSD SMA with their associated plant designators. Note that only specific portions of these systems are included in the LPSD SEL and SMA models. Because the support systems provide support functions for multiple frontline systems, their availability after an earthquake is critical for successful mitigation of the seismic event.

The SELs are presented in Table 19.1-42A, which includes approximately 352 components. The structures associated with the SEL equipment are listed in Subsection 19.1.5.1.1.2.

19.1.6.5.2.2 Seismic Fragility Analysis

The following building structures and the RCS components of the APR1400 standard design are evaluated by the CDFM method using the design-specific information within the scope of the DC application. The resulting HCLPF capacities and the associated failure modes of the SSCs are summarized in Table 19.1-43A and all the SSCs meet the target HCLPF capacity of 0.5g.

a. Safety-related building structures

   1) Reactor containment building

   2) Reactor containment internal

   3) Auxiliary building

   4) Emergency diesel generator building/diesel fuel oil tank building

b. RCS components

   1) Reactor pressure vessel (RPV)

19.1.6.5.2.3 Risk Insights

19.1.6.5.2.3.1 CDF Risk Insights

19.1.6.5.2.3.1.1 Dominant CDF Sequences for POS 3B and 4A

The dominant sequences for CDF POS 3B and 4A were identified for the seismic margin model quantification:

a. Seismic failure of the Compound Building impacting safety-related structures and seismic failure of the Turbine Building impacting safety-related structures are the

"A" (6/10)

dominate core damage contributors. These two failures are based on an assumption that the design is for the licensee to develop and that the HCLPF will have a value equal to or exceeding 1.67 times CSDRS. This is HCLPF is 0.5g.

b. Auxiliary Building failure is the second highest contributor to CDF. This is basic event SEIS-AB-FAIL and is assumed to result directly in core damage. The HCLPF for this failure is 0.51g.

c. Seismic failure of the Nuclear Island sliding into the turbine building is the third highest contributor to CDF. This is basic event SEIS-NI-FAIL and is assumed to result directly in core damage. The HCLPF for this failure is 0.52g.

d. Correlated seismic failure of all the Emergency Diesel Generators resulting in sustained station blackout is the fourth highest CDF contributor. This failure is based on an assumption that the design is for the licensee to develop and that the HCLPF will have a value equal to or exceeding 1.67 times CSDRS. This is HCLPF is 0.5g.

e. The correlated failure of all equipment other than the NSSS is the fifth highest contributor to CDF. This failure is based on an assumption that the design is for the licensee to develop and that the HCLPF will have a value equal to or exceeding 1.67 times CSDRS. This is HCLPF is 0.5g.

f. The seismic failure of the containment hatch falling over from the stowed position conservatively modeled as resulting directly in core damage is the sixth highest contributor to CDF. This failure is based on an assumption that the design is for the licensee to develop and that the HCLPF will have a value equal to or exceeding 1.67 times CSDRS. This is HCLPF is 0.5g.

g. Failure of the containment exterior is the seventh most significant contributor to core damage. This is basic event SEIS-CTS-EX-FAIL and is assumed to result directly in core damage. The HCLPF for this failure is 0.94g.

h. Failure of the containment interior is the eighth most significant contributor to core damage. This is basic event SEIS-CTS-IN-FAIL and is assumed to result directly in core damage. The HCLPF for this failure is 1.09.

i. Seismic failure of the DG Fuel Oil Tank Building combined with failure to run of Emergency Gas Turbine Generator and Emergency Diesel Generator C is the ninth highest contributor to CDF. The HCLPF for seismic failure of the DG Fuel Oil Tank Building is 0.73g.

19.1.6.5.2.3.1.2 Dominant CDF Sequences for POS 4B, 5, 6, and 10

The dominant sequences for CDF POS 4B, 5, 6, and 10 were identified for the seismic margin model quantification:

a. Seismic failure of the Compound Building impacting safety-related structures and seismic failure of the Turbine Building impacting safety-related structures are the dominate core damage contributors. These two failures are based on an assumption that

"A" (7/10)

the design is for the licensee to develop and that the HCLPF will have a value equal to or exceeding 1.67 times CSDRS. This is HCLPF is 0.5g.

b. Auxiliary Building failure is the second highest contributor to CDF. This is basic event SEIS-AB-FAIL and is assumed to result directly in core damage. The HCLPF for this failure is 0.51g.

c. Seismic failure of the Nuclear Island sliding into the turbine building is the third highest contributor to CDF. This is basic event SEIS-NI-FAIL and is assumed to result directly in core damage. The HCLPF for this failure is 0.52g.

d. Correlated seismic failure of all the Emergency Diesel Generators resulting in sustained station blackout is the fourth highest CDF contributor. This failure is based on an assumption that the design is for the licensee to develop and that the HCLPF will have a value equal to or exceeding 1.67 times CSDRS. This is HCLPF is 0.5g.

e. The correlated failure of all equipment other than the NSSS is the fifth highest contributor to CDF. This failure is based on an assumption that the design is for the licensee to develop and that the HCLPF will have a value equal to or exceeding 1.67 times CSDRS. This is HCLPF is 0.5g.

f. The seismic failure of the reactor vessel head falling over from the stowed position conservatively modeled as resulting directly in core damage is the sixth highest contributor to CDF. This failure is based on an assumption that the design is for the licensee to develop and that the HCLPF will have a value equal to or exceeding 1.67 times CSDRS. This is HCLPF is 0.5g.

g. Failure of the containment exterior is the seventh most significant contributor to core damage. This is basic event SEIS-CTS-EX-FAIL and is assumed to result directly in core damage. The HCLPF for this failure is 0.94g.

h. Failure of the containment interior is the eighth most significant contributor to core damage. This is basic event SEIS-CTS-IN-FAIL and is assumed to result directly in core damage. The HCLPF for this failure is 1.09.

i. Seismic failure of the DG Fuel Oil Tank Building combined with failure to run of Emergency Gas Turbine Generator and Emergency Diesel Generator C is the ninth highest contributor to CDF. The HCLPF for seismic failure of the DG Fuel Oil Tank Building is 0.73g

19.1.6.5.2.3.1.3 Dominant CDF Sequences for POS 11

The dominant sequences for CDF POS 11 were identified for the seismic margin model quantification:

a. Seismic failure of the Compound Building impacting safety-related structures and seismic failure of the Turbine Building impacting safety-related structures are the dominate core damage contributors. These two failures are based on an assumption that

"A" (8/10)

the design is for the licensee to develop and that the HCLPF will have a value equal to or exceeding 1.67 times CSDRS. This is HCLPF is 0.5g.

b. Auxiliary Building failure is the second highest contributor to CDF. This is basic event SEIS-AB-FAIL and is assumed to result directly in core damage. The HCLPF for this failure is 0.51g.

c. Seismic failure of the Nuclear Island sliding into the turbine building is the third highest contributor to CDF. This is basic event SEIS-NI-FAIL and is assumed to result directly in core damage. The HCLPF for this failure is 0.52g.

d. Correlated seismic failure of all the Emergency Diesel Generators resulting in sustained station blackout is the fourth highest CDF contributor. This failure is based on an assumption that the design is for the licensee to develop and that the HCLPF will have a value equal to or exceeding 1.67 times CSDRS. This is HCLPF is 0.5g.

e. The correlated failure of all equipment other than the NSSS is the fifth highest contributor to CDF. This failure is based on an assumption that the design is for the licensee to develop and that the HCLPF will have a value equal to or exceeding 1.67 times CSDRS. This is HCLPF is 0.5g.

f. The seismic failure of the reactor vessel head falling over from the stowed position conservatively modeled as resulting directly in core damage is the sixth highest contributor to CDF. This failure is based on an assumption that the design is for the licensee to develop and that the HCLPF will have a value equal to or exceeding 1.67 times CSDRS. This is HCLPF is 0.5g.

g. Failure of the containment exterior is the seventh most significant contributor to core damage. This is basic event SEIS-CTS-EX-FAIL and is assumed to result directly in core damage. The HCLPF for this failure is 0.94g.

h. Failure of the containment interior is the eighth most significant contributor to core damage. This is basic event SEIS-CTS-IN-FAIL and is assumed to result directly in core damage. The HCLPF for this failure is 1.09.

i. Sustained seismic loss of offsite power combined with plugged ESW debris filter is the ninth highest contributor to CDF. The HCLPF for seismic loss of offsite power is 0.09g.

19.1.6.5.2.3.1.4 Dominant CDF Sequences for POS 12A

The dominant sequences for CDF POS 12A were identified for the seismic margin model quantification:

a. Seismic failure of the Compound Building impacting safety-related structures and seismic failure of the Turbine Building impacting safety-related structures are the dominate core damage contributors. These two failures are based on an assumption that the design is for the licensee to develop and that the HCLPF will have a value equal to or exceeding 1.67 times CSDRS. This is HCLPF is 0.5g.

"A" (9/10)

b. Auxiliary Building failure is the second highest contributor to CDF. This is basic event SEIS-AB-FAIL and is assumed to result directly in core damage. The HCLPF for this failure is 0.51g.

c. Seismic failure of the Nuclear Island sliding into the turbine building is the third highest contributor to CDF. This is basic event SEIS-NI-FAIL and is assumed to result directly in core damage. The HCLPF for this failure is 0.52g.

d. Correlated seismic failure of all the Emergency Diesel Generators resulting in sustained station blackout is the fourth highest CDF contributor. This failure is based on an assumption that the design is for the licensee to develop and that the HCLPF will have a value equal to or exceeding 1.67 times CSDRS. This is HCLPF is 0.5g.

e. The correlated failure of all equipment other than the NSSS is the fifth highest contributor to CDF. This failure is based on an assumption that the design is for the licensee to develop and that the HCLPF will have a value equal to or exceeding 1.67 times CSDRS. This is HCLPF is 0.5g.

f. The seismic failure of the reactor vessel head falling over from the stowed position conservatively modeled as resulting directly in core damage is the sixth highest contributor to CDF. This failure is based on an assumption that the design is for the licensee to develop and that the HCLPF will have a value equal to or exceeding 1.67 times CSDRS. This is HCLPF is 0.5g.

g. Failure of the containment exterior is the seventh most significant contributor to core damage. This is basic event SEIS-CTS-EX-FAIL and is assumed to result directly in core damage. The HCLPF for this failure is 0.94g.

h. Failure of the containment interior is the eighth most significant contributor to core damage. This is basic event SEIS-CTS-IN-FAIL and is assumed to result directly in core damage. The HCLPF for this failure is 1.09.

i. Sustained seismic loss of offsite power combined with operator failure to restore SCS is the ninth highest contributor to CDF. The HCLPF for seismic loss of offsite power is 0.09g.

19.1.6.5.2.3.2 Level 2 Risk Insights

The direct to core damage seismic failures were considered to proceed directly from Core Damage to Large Early Release. This includes seismic failure of:

- Compound building
- Turbine building
- Auxiliary building
- Nuclear Island failure
- Reactor Containment building
- Reactor Containment Internals

"A" (10/10)

- Containment Hatch (Open & Stowed) for POS 3B & 4A only
- Reactor Vessel Head (Removed and Stowed) for POS 4B through 12A only

Seismic failure resulting in station blackout and resulting in core damage are also assumed to result in LERF. This would include seismic failures of the following equipment that result in core damage:

- Emergency Diesel Generator Building
- Diesel Fuel Oil Tank Building
- Emergency Diesel Generators

In addition, all S-NRLOCA sequences resulting in core damage are considered to proceed directly to core damage as discussed in the assumptions. Also, core damage resulting from seismic loss of offsite power in POS 3B and 4A are also considered to proceed directly to core damage.

The initiating events that required additional modeling for level 2 analysis included seismic failure of I&C for all POS and seismic loss of offsite power for POS 4B through 12A. The only significant failure for the level 2 modeling was the correlated failure of all equipment other than the NSSS. This failure is based on an assumption that the design is for the licensee to develop and that the HCLPF will have a value equal to or exceeding 1.67 times CSDRS.

The top contributors for large early release are the same as the top contributors for core damage:

a. All the seismic failures resulting in core damage that are assumed to proceed directly to large early release are included in the tops contributors for core damage.

b. The only significant seismic failure from the modeling of level 2, correlated failure of all equipment other than the NSSS, is also a top contributor to LERF.

These two considerations together cover all of the top contributors to core damage. Therefore, the list of top contributors to Level 2 failures must be the same the top contributors to core damage.

Table 19.1-41 (2 of 2)

System	Description
MCR	Main Control Room Consoles
ESF	ESF Cabinets
RX Trip	Reactor Trip Switchgear
DG Fuel	Diesel Fuel Oil Transfer System
EDG	Emergency Diesel Generators
EP	Electrical power

Insert "B"

Insert "C"

"B" (1/1)

Table 19.1-41A

Systems Considered for the LPSD SEL (1 of 1)

System	Description
Actuation	Containment isolation (CIS)
	Containment ventilation isolation (CVIS)
	EDG start and load sequence
RCS	Reactor Coolant System, including RC Pumps, SG, PZR, SRVs, POSRVs
MS	Main Steam: MS SRVs, MS SG ADVs
AFW	Auxiliary Feedwater (MD pump only)
CVCS	Chemical Volume & Control System: Charging only
SC	Shutdown Cooling System
SI	Safety Injection
CCW	Component Cooling Water
ESW	Essential Service Water
ECW	Essential Chilled Water
EDG HVAC	Emergency Diesel Generator Area HVAC System
E-I&C HVAC	Electrical and I&C Equipment Areas HVAC System
ESW/CCW HVAC	ESW Pump Building / CCW HX Building HVAC System
Aux Bldg HVAC	Aux Building Controlled Area HVAC System
Aux Bldg HVAC	Aux Building Clean Area HVAC System
MCR	Main Control Room Consoles
ESF	ESF Cabinets
DG Fuel	Diesel Fuel Oil Transfer System
EDG	Emergency Diesel Generators
EP	Electrical power

"C" (1/1)

Table 19.1-41B

LPSD SMA Plant Operating States (1 of 1)

Plant Operating State	Description	Primary Sys. Water Lvl	Primary System Pressure & Temperature	Tech. Spec. Mode
3B	Cooldown with Shutdown Cooling System to 140°F		450-15 psia; 212–140°F	5
4A	Reactor Coolant System drain-down (pressurizer manway closed)	Below Reactor Flange	Slight positive pressure or depressurized; ≤140°F	
4B	Reactor Coolant System drain-down (manway open)		Depressurized; ≤140°F	
5	Reduced Inventory operation and nozzle dam installation			
6	Fill for refueling			
10	Reactor Coolant System drain-down to Reduced Inventory after refueling		Depressurized or slight vacuum during refill; ≤140°F	
11	Reduced Inventory operation with steam generator manway closure			
12A	Refill Reactor Coolant System (pressurizer manway open)			

Table 19.1-42 (21 of 21)

No.	Equipment ID	Equipment Description	Floor Elevation	Building
371	1-443-M-HR09B	Medium Passive Autocatalytic Recombiner (PAR)	97'	Containment
372	1-443-M-HR10A	Medium Passive Autocatalytic Recombiner (PAR)	97'	Containment
373	1-443-M-HR10B	Medium Passive Autocatalytic Recombiner (PAR)	97'	Containment
374	1-443-M-HR11A	Medium Passive Autocatalytic Recombiner (PAR)	102'	Containment
375	1-443-M-HR11B	Medium Passive Autocatalytic Recombiner (PAR)	102'	Containment
376	1-443-M-HR12A	Medium Passive Autocatalytic Recombiner (PAR)	116'	Containment
377	1-443-M-HR12B	Medium Passive Autocatalytic Recombiner (PAR)	116'	Containment
378	1-443-M-HR13A	Medium Passive Autocatalytic Recombiner (PAR)	138' 6"	Containment
379	1-443-M-HR13B	Medium Passive Autocatalytic Recombiner (PAR)	138' 6"	Containment
380	1-443-M-HR14A	Small Passive Autocatalytic Recombiner (PAR)	120'	Containment
381	1-443-M-HR14B	Small Passive Autocatalytic Recombiner (PAR)	95'	Containment
382	1-443-M-HR15A	Small Passive Autocatalytic Recombiner (PAR)	146'	Containment
383	1-443-M-HR15B	Small Passive Autocatalytic Recombiner (PAR)	194' 6"	Containment

← Insert "D"

"D" (1/17)

Table 19.1-42A (1 of 17)

LPSD Seismic Equipment List

No.	Equip Class	Official Tag #	Equipment Description	Floor Elevation	Building
1	SEIS-I	1-431-M-RV01	Reactor Pressure Vessel	69'-156'	CNTMT
2	SEIS-I	-	Reactor Vessel Head (Removed and Stowed)	-	CNTMT
3	SEIS-I	-	Reactor Vessel Internals	69'-156'	CNTMT
4	SEIS-I	1-431-M-SG01	Steam Generator #1	114'-136'	CNTMT
5	SEIS-I	1-431-M-SG02	Steam Generator #2	114'-136'	CNTMT
6	SEIS-I	1-431-M-PZ01	Pressurizer	114'-156'	CNTMT
7	SEIS-I	1-431-M-PP01A	Reactor Coolant Pump #1	114'-136'	CNTMT
8	SEIS-I	1-431-M-PP01B	Reactor Coolant Pump #2	114'-136'	CNTMT
9	SEIS-I	1-431-M-PP01C	Reactor Coolant Pump #3	114'-136'	CNTMT
10	SEIS-I	1-431-M-PP01D	Reactor Coolant Pump #4	114'-136'	CNTMT
11	SEIS-I	1-451-M-HE01	Regenerative Heat Exchanger	128'	CNTMT
12	SEIS-I	-	Polar Crane	-	CNTMT
13	SEIS-I	-	Jib Cranes	-	CNTMT
14	SEIS-I	-	Containment Hatch (Open & Stowed)	-	CNTMT
15	SEIS-I	1-451-M-PP01A	Charging Pumps #1	55'	AUX BLDG
16	SEIS-I	1-451-M-PP01B	Charging Pumps #2	55'	AUX BLDG
17	SEIS-I	1-451-M-HE02	Letdown Heat Exchanger	100'	CNTMT
18	SEIS-I	1-441-M-TK01A	Safety Injection Tank 1	136'	CNTMT
19	SEIS-I	1-441-M-TK01B	Safety Injection Tank 2	136'	CNTMT
20	SEIS-I	1-441-M-TK01C	Safety Injection Tank 3	136'	CNTMT
21	SEIS-I	1-441-M-TK01D	Safety Injection Tank 4	136'	CNTMT
22	SEIS-I	1-521-V-0012	Main Steam Isolation Valve	137'	AUX BLDG
23	SEIS-I	1-521-V-0011	Main Steam Isolation Valve	137'	AUX BLDG
24	SEIS-I	1-521-V-0014	Main Steam Isolation Valve	137'	AUX BLDG
25	SEIS-I	1-521-V-0013	Main Steam Isolation Valve	137'	AUX BLDG

"D" (2/17)

Table 19.1-42A (2 of 17)

No.	Equip Class	Official Tag #	Equipment Description	Floor Elevation	Building
26	SEIS-I	1-521-V-0102	Main Steam Atmospheric Dump Valve	137'	AUX BLDG
27	SEIS-I	1-521-V-0101	Main Steam Atmospheric Dump Valve	137'	AUX BLDG
28	SEIS-I	1-521-V-0104	Main Steam Atmospheric Dump Valve	137'	AUX BLDG
29	SEIS-I	1-521-V-0103	Main Steam Atmospheric Dump Valve	137'	AUX BLDG
30	SEIS-I	1-461-M-TK01A	Component Cooling Water Surge Tank	172'	AUX BLDG
31	SEIS-I	1-461-M-TK01B	Component Cooling Water Surge Tank	172'	AUX BLDG
32	SEIS-II	1-633-M-CH01A	Essential Chiller (includes Compressor Condensor, Evaporator, controls, RVs, Tanks)	78'	AUX BLDG
33	SEIS-II	1-633-M-CH02A	Essential Chiller (includes Compressor Condensor, Evaporator, controls, RVs, Tanks)	78'	AUX BLDG
34	SEIS-II	1-633-M-CH01B	Essential Chiller (includes Compressor Condensor, Evaporator, controls, RVs, Tanks)	78'	AUX BLDG
35	SEIS-II	1-633-M-CH02B	Essential Chiller (includes Compressor Condensor, Evaporator, controls, RVs, Tanks)	78'	AUX BLDG
36	SEIS-I	1-607-M-HV33A	MDAFW Pump Room Unit	78'	AUX BLDG
37	SEIS-I	1-607-M-HV33B	MDAFW Pump Room Unit	78'	AUX BLDG
38	SEIS-I	1-607-M-CW33A	MDAFW Pump Room Cubical Cooler Cooling Coil	78'	AUX BLDG
39	SEIS-I	1-607-M-CW33B	MDAFW Pump Room Cubical Cooler Cooling Coil	78'	AUX BLDG
40	SEIS-I	1-431-V-0200	POSRV 200	136'	CNTMT
41	SEIS-I	1-431-V-0201	POSRV 201	136'	CNTMT
42	SEIS-I	1-431-V-0132	MOV Control Valves (POSRV 201)	136'	CNTMT
43	SEIS-I	1-431-V-0133	MOV Control Valves (POSRV 201)	136'	CNTMT
44	SEIS-I	1-431-V-0202	POSRV 202	136'	CNTMT
45	SEIS-I	1-431-V-0134	MOV Control Valves (POSRV 202)	136'	CNTMT
46	SEIS-I	1-431-V-0135	MOV Control Valves (POSRV 202)	136'	CNTMT
47	SEIS-I	1-431-V-0203	POSRV 203	136'	CNTMT
48	SEIS-I	1-431-V-0136	MOV Control Valves (POSRV 203)	136'	CNTMT

"D" (3/17)

Table 19.1-42A (3 of 17)

No.	Equip Class	Official Tag #	Equipment Description	Floor Elevation	Building
49	SEIS-I	1-431-V-0137	MOV Control Valves (POSRV 203)	136'	CNTMT
50	SEIS-I	1-441-M-PP02A	SI Pump 1	50'	AUX BLDG
51	SEIS-I	1-441-M-PP01A	SDC Pump 1	50'	AUX BLDG
52	SEIS-I	1-441-M-HE02A	SDC Miniflow HX 1	50'	AUX BLDG
53	SEIS-I	1-441-M-HE01A	SDC HX 1	50'	AUX BLDG
54	SEIS-I	1-441-M-PP02C	SI Pump 3	50'	AUX BLDG
55	SEIS-I	1-441-M-PP02B	SI Pump 2	50'	AUX BLDG
56	SEIS-I	1-441-M-PP01B	SDC Pump 2	50'	AUX BLDG
57	SEIS-I	1-441-M-HE02B	SDC Miniflow HX 2	50'	AUX BLDG
58	SEIS-I	1-441-M-HE01B	SDC HX 2	50'	AUX BLDG
59	SEIS-I	1-441-M-PP02D	SI Pump 4	50'	AUX BLDG
60	SEIS-I	1-442-M-PP01A	Containment Spray Pump 1	50'	AUX BLDG
61	SEIS-I	1-442-M-HE02A	CS Pump 1 Miniflow Heat Exchanger	50'	AUX BLDG
62	SEIS-I	1-442-M-HE01A	Containment Spray Line 1 Heat Exchanger	55'	AUX BLDG
63	SEIS-I	1-442-M-PP01B	Containment Spray Pump 2	50'	AUX BLDG
64	SEIS-I	1-442-M-HE02B	CS Pump 2 Miniflow Heat Exchanger	50'	AUX BLDG
65	SEIS-I	1-442-M-HE01B	Containment Spray Line 2 Heat Exchanger	55'	AUX BLDG
66	SEIS-I	1-451-M-PP03	Auxiliary Charging Pump	55'	AUX BLDG
67	SEIS-I	1-461-M-PP01A	CCW Pump 1A	55'	AUX BLDG
68	SEIS-I	1-461-M-PP02A	CCW Pump 2A	55'	AUX BLDG
69	SEIS-I	1-461-M-HE01A	CCW Heat Exchanger 1A	100'	CCW HX BLDG
70	SEIS-I	1-461-M-HE02A	CCW Heat Exchanger 2A	100'	CCW HX BLDG
71	SEIS-I	1-461-M-HE03A	CCW Heat Exchanger 3A	100'	CCW HX BLDG

"D" (4/17)

Table 19.1-42A (4 of 17)

No.	Equip Class	Official Tag #	Equipment Description	Floor Elevation	Building
72	SEIS-I	1-461-M-PP03B	CCW Makeup Pump 3B	78'	AUX BLDG
73	SEIS-I	1-461-M-PP01B	CCW Pump 1B	55'	AUX BLDG
74	SEIS-I	1-461-M-PP02B	CCW Pump 2B	55'	AUX BLDG
75	SEIS-I	1-461-M-HE01B	CCW Heat Exchanger 1B	100'	CCW HX BLDG
76	SEIS-I	1-461-M-HE02B	CCW Heat Exchanger 2B	100'	CCW HX BLDG
77	SEIS-I	1-461-M-HE03B	CCW Heat Exchanger 3B	100'	CCW HX BLDG
78	SEIS-I	1-451-M-HE04	Charging Pump Mini-Flow Heat Exchanger	55'	AUX BLDG
79	SEIS-I	1-462-M-PP01A	ESW Pump 1A	69'	ESW Intake Structure
80	SEIS-I	1-462-M-PP02A	ESW Pump 2A	69'	ESW Intake Structure
81	SEIS-I	1-462-M-PP01B	ESW Pump 1B	69'	ESW Intake Structure
82	SEIS-I	1-462-M-PP02B	ESW Pump 2B	69'	ESW Intake Structure
83	SEIS-I	1-542-M-PP02A	Aux Feedwater Pump A (Motor Driven)	78'	AUX BLDG
84	SEIS-I	1-542-M-PP02B	Aux Feedwater Pump B (Motor Driven)	78'	AUX BLDG
85	SEIS-I	1-591-M-PP22A	Fuel Oil Feed Pump	100'	EDG BLDG
86	SEIS-I	1-591-M-PP22B	Fuel Oil Feed Pump	100'	EDG BLDG
87	SEIS-I	1-591-M-PP22C	Fuel Oil Feed Pump	100'	AUX BLDG
88	SEIS-I	1-591-M-PP22D	Fuel Oil Feed Pump	100'	AUX BLDG
89	SEIS-I	1-595-M-TK01A	Diesel Fuel Oil Storage Tank A	63'	EDG BLDG
90	SEIS-I	1-595-M-PP02A	Diesel Fuel Oil Transfer Pump	63'	EDG BLDG
91	SEIS-I	1-595-M-PP01A	Diesel Fuel Oil Transfer Pump	63'	EDG BLDG
92	SEIS-I	1-595-M-TK01B	Diesel Fuel Oil Storage Tank B	63'	EDG BLDG
93	SEIS-I	1-595-M-PP02B	Diesel Fuel Oil Transfer Pump	63'	EDG BLDG
94	SEIS-I	1-595-M-PP01B	Diesel Fuel Oil Transfer Pump	63'	EDG BLDG

"D" (5/17)

Table 19.1-42A (5 of 17)

No.	Equip Class	Official Tag #	Equipment Description	Floor Elevation	Building
95	SEIS-I	1-595-M-TK01C	Diesel Fuel Oil Storage Tank C	65'	AUX BLDG
96	SEIS-I	1-595-M-PP02C	Diesel Fuel Oil Transfer Pump	65'	AUX BLDG
97	SEIS-I	1-595-M-PP01C	Diesel Fuel Oil Transfer Pump	65'	AUX BLDG
98	SEIS-I	1-595-M-TK01D	Diesel Fuel Oil Storage Tank D	65'	AUX BLDG
99	SEIS-I	1-595-M-PP02D	Diesel Fuel Oil Transfer Pump	65'	AUX BLDG
100	SEIS-I	1-595-M-PP01D	Diesel Fuel Oil Transfer Pump	65'	AUX BLDG
101	SEIS-I	1-595-M-TK02A	Diesel Fuel Oil Day Tank A	121'	EDG BLDG
102	SEIS-I	1-595-M-TK02B	Diesel Fuel Oil Day Tank B	121'	EDG BLDG
103	SEIS-I	1-595-M-TK02C	Diesel Fuel Oil Day Tank C	120'	AUX BLDG
104	SEIS-I	1-595-M-TK02D	Diesel Fuel Oil Day Tank D	120'	AUX BLDG
105	SEIS-I	1-601-V-Y0011A	Electro-Hydraulic Inlet Damper	172'	AUX BLDG
106	SEIS-I	1-601-V-Y0011B	Electro-Hydraulic Inlet Damper	172'	AUX BLDG
107	SEIS-I	1-602-M-HV12A	EDG Room Emergency Cubical Cooler	100'	EDG BLDG
108	SEIS-I	1-602-M-AH02A	EDG Room Exhaust Fan/Motor	100'	EDG BLDG
109	SEIS-I	1-602-M-HV13A	EDG Room Emergency Cubical Cooler	135'	EDG BLDG
110	SEIS-I	1-602-M-HV12B	EDG Room Emergency Cubical Cooler	100'	EDG BLDG
111	SEIS-I	1-602-M-AH12B	EDG Room Emergency Cubical Cooler Fan/Motor	100'	EDG BLDG
112	SEIS-I	1-602-M-AH02B	EDG Room Exhaust Fan/Motor	100'	EDG BLDG
113	SEIS-I	1-602-M-HV13B	EDG Room Emergency Cubical Cooler	135'	EDG BLDG
114	SEIS-I	1-602-M-AH13B	EDG Room Emergency Cubical Cooler Fan/Motor	135'	EDG BLDG
115	SEIS-I	1-602-M-HV12C	EDG Room Emergency Cubical Cooler	100'	AUX BLDG
116	SEIS-I	1-602-M-AH12C	EDG Room Emergency Cubical Cooler Fan/Motor	100'	AUX BLDG

"D" (6/17)

Table 19.1-42A (6 of 17)

No.	Equip Class	Official Tag #	Equipment Description	Floor Elevation	Building
117	SEIS-I	1-602-M-AH02C	EDG Room Exhaust Fan/Motor	172'	AUX BLDG
118	SEIS-I	1-602-M-HV13C	EDG Room Emergency Cubical Cooler	100'	AUX BLDG
119	SEIS-I	1-602-M-AH13C	EDG Room Emergency Cubical Cooler Fan/Motor	100'	AUX BLDG
120	SEIS-I	1-602-M-HV12D	EDG Room Emergency Cubical Cooler	100'	AUX BLDG
121	SEIS-I	1-602-M-AH12D	EDG Room Emergency Cubical Cooler Fan/Motor	100'	AUX BLDG
122	SEIS-I	1-602-M-AH02D	EDG Room Exhaust Fan/Motor	172'	AUX BLDG
123	SEIS-I	1-602-M-HV13D	EDG Room Emergency Cubical Cooler	100'	AUX BLDG
124	SEIS-I	1-602-M-AH13D	EDG Room Emergency Cubical Cooler Fan/Motor	100'	AUX BLDG
125	SEIS-I	1-603-M-HV11A	ELECT. PENETRATION RM Cubical Cooler	137'	AUX BLDG
126	SEIS-I	1-603-M-HV10A	480V CLASS-1E MCC 03C RM Cubical Cooler	137'	AUX BLDG
127	SEIS-I	1-603-M-HV09A	ELECT. PENETRATION RM Cubical Cooler	120'	AUX BLDG
128	SEIS-I	1-603-M-HV04A	CHANNEL C DC&IP EQUIP. RM Cubical Cooler	78'	AUX BLDG
129	SEIS-I	1-603-M-HV02A	CLASS 1E LOADCENTER 01C RM Cubical Cooler	78'	AUX BLDG
130	SEIS-I	1-603-M-HV01A	CLASS 1E SWITCHGEAR 01C RM Cubical Cooler	78'	AUX BLDG
131	SEIS-I	1-603-M-HV14A	480V CLASS-1E MCC 03A RM Cubical Cooler	137'	AUX BLDG
132	SEIS-I	1-603-M-HV15A	480V CLASS-1E MCC 04A RM Cubical Cooler	137'	AUX BLDG
133	SEIS-I	1-603-M-HV12A	PENETRATION MUX A RM Cubical Cooler	137'	AUX BLDG
134	SEIS-I	1-603-M-HV13A	ELECTRICAL PENETRATION RM(A) Cubical Cooler	137'	AUX BLDG
135	SEIS-I	1-603-M-AH21A	Class 1E Battery Rm Exhaust Fan	100'	AUX BLDG
136	SEIS-I	1-603-M-HV03A	CHANNEL A DC&IP EQUIP. RM CC Cubical Cooler	78'	AUX BLDG
137	SEIS-I	1-603-M-HV05A	MUX A RM Cubical Cooler	78'	AUX BLDG
138	SEIS-I	1-603-M-HV07A	CLASS-1E SWITCHGEAR 01A RM Cubical Cooler	78'	AUX BLDG

"D" (7/17)

Table 19.1-42A (7 of 17)

No.	Equip Class	Official Tag #	Equipment Description	Floor Elevation	Building
139	SEIS-I	1-603-M-AH21C	Class 1E Battery Rm Exhaust Fan	78'	AUX BLDG
140	SEIS-I	1-603-M-HV11B	ELECT. PENETRATION RM (D) Cubical Cooler	137'	AUX BLDG
141	SEIS-I	1-603-M-HV10B	480V CLASS-1E MCC 03D RM Cubical Cooler	137'	AUX BLDG
142	SEIS-I	1-603-M-HV15B	480V CLASS-1E MCC 04B RM Cubical Cooler	137'	AUX BLDG
143	SEIS-I	1-603-M-HV12B	PENETRATION MUX B RM Cubical Cooler	137'	AUX BLDG
144	SEIS-I	1-603-M-HV13B	ELECTRICAL PENETRATION RM(B) Cubical Cooler	137'	AUX BLDG
145	SEIS-I	1-603-M-HV18A	RSP RM Cubical Cooler	137'	AUX BLDG
146	SEIS-I	1-603-M-HV18B	RSP RM Cubical Cooler	137'	AUX BLDG
147	SEIS-I	1-603-M-HV09B	ELECT. PENETRATION (D) RM Cubical Cooler	120'	AUX BLDG
148	SEIS-I	1-603-M-HV14B	480V CLASS-1E MCC 03B RM Cubical Cooler	120'	AUX BLDG
149	SEIS-I	1-603-M-HV06B	480V CLASS 1-E MCC 01B RM Cubical Cooler	100'	AUX BLDG
150	SEIS-I	1-603-M-HV03B	CHANNEL B DC&IP EQUIP. RM Cubical Cooler	78'	AUX BLDG
151	SEIS-I	1-603-M-HV05B	MUX B RM Cubical Cooler	78'	AUX BLDG
152	SEIS-I	1-603-M-HV02B	CLASS 1E LOADCENTER 01D RM Cubical Cooler	78'	AUX BLDG
153	SEIS-I	1-603-M-HV01B	CLASS 1E SWITCHGEAR 01D RM Cubical Cooler	78'	AUX BLDG
154	SEIS-I	1-603-M-HV04B	CHANNEL D DC&IP EQUIP. RM Cubical Cooler	78'	AUX BLDG
155	SEIS-I	1-603-M-HV07B	CLASS-1E SWITCHGEAR 01B RM Cubical Cooler	78'	AUX BLDG
156	SEIS-I	1-603-M-HV17A	I&C Equipment Room (C) Cubical Cooler	157'	AUX BLDG
157	SEIS-I	1-603-M-HV16A	I&C Equipment Room (A) Cubical Cooler	157'	AUX BLDG
158	SEIS-I	1-603-M-HV17B	I&C Equipment Room (D) Cubical Cooler	157'	AUX BLDG
159	SEIS-I	1-603-M-HV16B	I&C Equipment Room (B) Cubical Cooler	157'	AUX BLDG
160	SEIS-I	1-605-M-AH03A	CCW Heat Exchanger Room Supply Fan	100'	CCW HX BLDG

"D" (8/17)

Table 19.1-42A (8 of 17)

No.	Equip Class	Official Tag #	Equipment Description	Floor Elevation	Building
161	SEIS-I	1-605-M-AH03B	CCW Heat Exchanger Room Supply Fan	100'	CCW HX BLDG
162	SEIS-I	1-605-M-AH01A	ESW Pump Room Supply Fan	90'	ESW Intake Struct
163	SEIS-I	1-605-M-AH02A	ESW Pump Room Supply Fan	90'	ESW Intake Struct
164	SEIS-I	1-605-M-AH01B	ESW Pump Room Supply Fan	90'	ESW Intake Struct
165	SEIS-I	1-605-M-AH02B	ESW Pump Room Supply Fan	90'	ESW Intake Struct
166	SEIS-I	1-606-M-HV14A	CCW PUMP RM Aux Bld Controlled Area HVAC Fan/Motor	55'	AUX BLDG
167	SEIS-I	1-606-M-HV15A	CS HEAT EXCHANGER RM Aux Bld Controlled Area HVAC Fan/Motor	55'	AUX BLDG
168	SEIS-I	1-606-M-HV13A	CCW PUMP RM Aux Bld Controlled Area HVAC Fan/Motor	55'	AUX BLDG
169	SEIS-I	1-606-M-HV16A	SC PUMP & MINIFLOW HEAT EXCHANGER RM Aux Bld Controlled Area HVAC Fan/Motor	50'	AUX BLDG
170	SEIS-I	1-606-M-HV12A	SI PUMP RM Aux Bld Controlled Area HVAC Fan/Motor	50'	AUX BLDG
171	SEIS-I	1-606-M-HV17A	SC HEAT EXCHANGER RM Aux Bld Controlled Area HVAC Fan/Motor	55'	AUX BLDG
172	SEIS-I	1-606-M-HV10A	CS PUMP & MINIFLOW HEAT EXCHANGER RM Aux Bld Controlled Area HVAC Fan/Motor	50'	AUX BLDG
173	SEIS-I	1-606-M-HV11A	SI PUMP RM Aux Bld Controlled Area HVAC Fan/Motor	50'	AUX BLDG
174	SEIS-I	1-606-M-HV18A	CHARGING PUMP RM Aux Bld Controlled Area HVAC Fan/Motor	55'	AUX BLDG
175	SEIS-I	1-606-M-HV10B	CS PUMP & MINIFLOW HEAT EXCHANGER RM Aux Bld Controlled Area HVAC Fan/Motor	50'	AUX BLDG
176	SEIS-I	1-606-M-HV11B	SI PUMP RM Aux Bld Controlled Area HVAC Fan/Motor	50'	AUX BLDG
177	SEIS-I	1-606-M-HV12B	SI PUMP RM Aux Bld Controlled Area HVAC Fan/Motor	50'	AUX BLDG
178	SEIS-I	1-606-M-HV21B	AUX. CHARGING PUMP RM Aux Bld Controlled Area HVAC Fan/Motor	55'	AUX BLDG
179	SEIS-I	1-606-M-HV18B	CHARGING PUMP RM Aux Bld Controlled Area HVAC Fan/Motor	55'	AUX BLDG

"D" (9/17)

Table 19.1-42A (9 of 17)

No.	Equip Class	Official Tag #	Equipment Description	Floor Elevation	Building
180	SEIS-I	1-606-M-HV15B	CS HEAT EXCHANGER RM Aux Bld Controlled Area HVAC Fan/Motor	55'	AUX BLDG
181	SEIS-I	1-606-M-HV14B	CCW PUMP RM Aux Bld Controlled Area HVAC Fan/Motor	55'	AUX BLDG
182	SEIS-I	1-606-M-HV13B	CCW PUMP RM Aux Bld Controlled Area HVAC Fan/Motor	55'	AUX BLDG
183	SEIS-I	1-606-M-HV16B	SC PUMP & MINIFLOW HEAT EXCHANGER RM Aux Bld Controlled Area HVAC Fan/Motor	50'	AUX BLDG
184	SEIS-I	1-606-M-HV17B	SC HEAT EXCHANGER RM Aux Bld Controlled Area HVAC Fan/Motor	55'	AUX BLDG
185	SEIS-I	1-606-M-HV20A	Mechanical Pen Room HVAC Fan/Motor	120'	AUX BLDG
186	SEIS-I	1-606-M-HV19A	Mechanical Pen Room HVAC Fan/Motor	100'	AUX BLDG
187	SEIS-I	1-606-M-HV20B	Mechanical Pen Room HVAC Fan/Motor	120'	AUX BLDG
188	SEIS-I	1-606-M-HV19B	Mechanical Pen Room HVAC Fan/Motor	100'	AUX BLDG
189	SEIS-I	1-606-M-AU01A	Aux Building Controlled Area (I) Emergency Exhaust ACU	156'	AUX BLDG
190	SEIS-I	1-606-M-AH01A	Aux Building Controlled Area (I) Emergency Exhaust ACU Fan/Motor	156'	AUX BLDG
191	SEIS-I	1-606-V-Y0002A	Aux Building Controlled Area (I) Emergency Exhaust ACU Inlet Damper	156'	AUX BLDG
192	SEIS-I	1-606-V-Y0001A	Aux Building Controlled Area (I) Emergency Exhaust ACU Outlet Damper	156'	AUX BLDG
193	SEIS-I	1-606-M-AU01B	Aux Building Controlled Area (II) Emergency Exhaust ACU	195'	AUX BLDG
194	SEIS-I	1-606-M-AH01B	Aux Building Controlled Area (II) Emergency Exhaust ACU Fan/Motor	195'	AUX BLDG
195	SEIS-I	1-606-V-Y0002B	Aux Building Controlled Area (II) Emergency Exhaust ACU Inlet Damper	195'	AUX BLDG
196	SEIS-I	1-606-V-Y0001B	Aux Building Controlled Area (II) Emergency Exhaust ACU Outlet Damper	195'	AUX BLDG
197	SEIS-I	1-633-M-PP01A	Essential Chilled Water Pump	78'	AUX BLDG
198	SEIS-I	1-633-M-PP02A	Essential Chilled Water Pump	78'	AUX BLDG
199	SEIS-I	1-607-M-CW31A	Ess. Chiller Room Cubical Cooler Cooling Coil	78'	AUX BLDG
200	SEIS-I	1-607-M-CW32A	Ess. Chiller Room Cubical Cooler Cooling Coil	78'	AUX BLDG

"D" (10/17)

Table 19.1-42A (10 of 17)

No.	Equip Class	Official Tag #	Equipment Description	Floor Elevation	Building
201	SEIS-I	1-603-M-CW02C	Class 1E Load Center 01C Room Cubical Cooler Cooling Coil	78'	AUX BLDG
202	SEIS-I	1-603-M-CW01C	Class 1E Switchgear 01C Room Cubical Cooler Cooling Coil	78'	AUX BLDG
203	SEIS-I	1-603-M-CW03A	Channel A DC&IP Equip Room Cubical Cooler Cooling Coil	78'	AUX BLDG
204	SEIS-I	1-603-M-CW04C	Channel C DC&IP Equip Room Cubical Cooler Cooling Coil	78'	AUX BLDG
205	SEIS-I	1-606-M-CW10A	CS (Quad C) Mini Flow HX Room Cubical Cooler Cooling Coil	50'	AUX BLDG
206	SEIS-I	1-606-M-CW15A	CS HX Room Cubical Cooler Cooling Coil	55'	AUX BLDG
207	SEIS-I	1-606-M-CW14A	CCW Pump (Quad C) Room Cubical Cooler Cooling Coil	55'	AUX BLDG
208	SEIS-I	1-606-M-CW11A	SI Pump (Quad C) Room Cubical Cooler Cooling Coil	50'	AUX BLDG
209	SEIS-I	1-603-M-CW07A	Class 1E Switchgear 01A Room Cubical Cooler Cooling Coil	78'	AUX BLDG
210	SEIS-I	1-607-M-CW33A	MDAFW Pump Room Cubical Cooler Cooling Coil	78'	AUX BLDG
211	SEIS-I	1-603-M-CW06A	480V Class 1E MCC 01A Room Cubical Cooler Cooling Coil	100'-0"	AUX BLDG
212	SEIS-I	1-606-M-CW17A	SC HX Room Cubical Cooler Cooling Coil	55'	AUX BLDG
213	SEIS-I	1-606-M-CW16A	SC Pump & Mini Flow HX Room Cubical Cooler Cooling Coil	50'	AUX BLDG
214	SEIS-I	1-606-M-CW13A	CCW Pump (Quad A) Room Cubical Cooler Cooling Coil	55'	AUX BLDG
215	SEIS-I	1-606-M-CW12A	SI Pump (Quad A) Room Cubical Cooler Cooling Coil	55'	AUX BLDG
216	SEIS-I	1-601-M-CW01A	Control Room Supply AHU Cooling Coil	172'	AUX BLDG
217	SEIS-I	1-603-M-CW17C	I&C Equip Room C Cubical Cooler Cooling Coil	157'	AUX BLDG
218	SEIS-I	1-603-M-CW16A	I&C Equip Room A Cubical Cooler Cooling Coil	157'	AUX BLDG
219	SEIS-I	1-603-M-CW10C	480V Class 1E MCC 03C Room Cubical Cooler Cooling Coil	137'	AUX BLDG
220	SEIS-I	1-603-M-CW15A	480V Class 1E MCC 04A Room Cubical Cooler Cooling Coil	137'	AUX BLDG
221	SEIS-I	1-603-M-CW14A	480V Class 1E MCC 03A Room Cubical Cooler Cooling Coil	137'	AUX BLDG

"D" (11/17)

Table 19.1-42A (11 of 17)

No.	Equip Class	Official Tag #	Equipment Description	Floor Elevation	Building
222	SEIS-I	1-633-M-PP01B	Essential Chilled Water Pump	78'	AUX BLDG
223	SEIS-I	1-633-M-PP02B	Essential Chilled Water Pump	78'	AUX BLDG
224	SEIS-I	1-607-M-CW31B	Ess. Chiller Room Cubical Cooler Cooling Coil	78'	AUX BLDG
225	SEIS-I	1-607-M-CW32B	Ess. Chiller Room Cubical Cooler Cooling Coil	78'	AUX BLDG
226	SEIS-I	1-603-M-CW02D	Class 1E Load Center 01D Room Cubical Cooler Cooling Coil	78'	AUX BLDG
227	SEIS-I	1-603-M-CW01D	Class 1E Switchgear 01D Room Cubical Cooler Cooling Coil	78'	AUX BLDG
228	SEIS-I	1-603-M-CW03B	Channel B DC&IP Equip Room Cubical Cooler Cooling Coil	78'	AUX BLDG
229	SEIS-I	1-603-M-CW04D	Channel D DC&IP Equip Room Cubical Cooler Cooling Coil	78'	AUX BLDG
230	SEIS-I	1-606-M-CW10B	CS (Quad D) Mini Flow HX Room Cubical Cooler Cooling Coil	50'	AUX BLDG
231	SEIS-I	1-606-M-CW14B	CCW Pump (Quad D) Room Cubical Cooler Cooling Coil	55'	AUX BLDG
232	SEIS-I	1-606-M-CW11B	SI Pump (Quad D) Room Cubical Cooler Cooling Coil	50'	AUX BLDG
233	SEIS-I	1-603-M-CW06B	480V Class 1E MCC 01B Room Cubical Cooler Cooling Coil	100'	AUX BLDG
234	SEIS-I	1-607-M-CW33B	MDAFW Pump Room Cubical Cooler Cooling Coil	78'	AUX BLDG
235	SEIS-I	1-603-M-CW07B	Class 1E Switchgear 01B Room Cubical Cooler Cooling Coil	78'	AUX BLDG
236	SEIS-I	1-606-M-CW16B	SC Pump & Mini Flow HX Room Cubical Cooler Cooling Coil	50'	AUX BLDG
237	SEIS-I	1-606-M-CW17B	SC HX Room Cubical Cooler Cooling Coil	55'	AUX BLDG
238	SEIS-I	1-606-M-CW13B	CCW Pump (Quad B) Room Cubical Cooler Cooling Coil	55'	AUX BLDG
239	SEIS-I	1-606-M-CW12B	SI Pump (Quad B) Room Cubical Cooler Cooling Coil	50'	AUX BLDG
240	SEIS-I	1-601-M-CW01B	Control Room Supply AHU Cooling Coil	172'	AUX BLDG
241	SEIS-I	1-603-M-CW16B	I&C Equip Room B Cubical Cooler Cooling Coil	157'	AUX BLDG
242	SEIS-I	1-603-M-CW17D	I&C Equip Room D Cubical Cooler Cooling Coil	157'	AUX BLDG
243	SEIS-I	1-603-M-CW18B	RSP Room Cubical Cooler Cooling Coil	137'	AUX BLDG

"D" (12/17)

Table 19.1-42A (12 of 17)

No.	Equip Class	Official Tag #	Equipment Description	Floor Elevation	Building
244	SEIS-I	1-603-M-CW10D	480V Class 1E MCC 03D Room Cubical Cooler Cooling Coil	137'	AUX BLDG
245	SEIS-I	1-603-M-CW15B	480V Class 1E MCC 04B Room Cubical Cooler Cooling Coil	137'	AUX BLDG
246	SEIS-I	1-603-M-CW12B	Pent. MUX B Room Cubical Cooler Cooling Coil	137'	AUX BLDG
247	SEIS-I	1-603-M-CW13B	Elect Penetration Room B Cubical Cooler Cooling Coil	137'	AUX BLDG
248	SEIS-I	1-603-M-CW14B	480V Class 1E MCC 03B Room Cubical Cooler Cooling Coil	120'"	AUX BLDG
249	SEIS-I	1-606-M-CW20B	Mechanical Penetration Room Cubical Cooler Cooling Coil	120'"	AUX BLDG
250	CLASS 1E	1-591-M-DG01A	4.16KV CLASS 1E DIESEL GENERATORS 1-591-M-DG01A	100'	EDG BLDG
251	CLASS 1E	1-591-M-DG01B	4.16KV CLASS 1E DIESEL GENERATORS 1-591-M-DG01B	100'	EDG BLDG
252	CLASS 1E	1-591-M-DG01C	4.16KV CLASS 1E DIESEL GENERATORS 1-591-M-DG01C	100'	AUX BLDG
253	CLASS 1E	1-591-M-DG01D	4.16KV CLASS 1E DIESEL GENERATORS 1-591-M-DG01D	100'	AUX BLDG
254	CLASS 1E	1-823-E-SW01A	CLASS 1E AB 4.16KV SWGR 01A	78'	AUX BLDG
255	CLASS 1E	1-823-E-SW01B	CLASS 1E AB 4.16KV SWGR 01B	78'	AUX BLDG
256	CLASS 1E	1-823-E-SW01D	CLASS 1E AB 4.16KV SWGR 01D	78'	AUX BLDG
257	CLASS 1E	1-823-E-SW01C	CLASS 1E AB 4.16KV SWGR 01C	78'	AUX BLDG
258	CLASS 1E	1-825-E-LC01A	CLASS 1E AUX. BLDG 480V LOAD CENTER 1-825-E-LC01A	78'	AUX BLDG
259	CLASS 1E	1-825-E-LC01A-A3	CLASS 1E 480V LOAD CENTER 1A	78'	AUX BLDG
260	CLASS 1E	1-825-E-LC01B	CLASS 1E AUX. BLDG 480V LOAD CENTER 1-825-E-LC01B(DIV.II)	78'	AUX BLDG
261	CLASS 1E	1-825-E-LC01B-A3	CLASS 1E 480V LOAD CENTER 1B	78'	AUX BLDG
262	CLASS 1E	1-825-E-LC01C	CLASS 1E AUX. BLDG 480V LOAD CENTER 1-825-E-LC01C	78'	AUX BLDG
263	CLASS 1E	1-825-E-LC01D	CLASS 1E AUX. BLDG 480V LOAD CENTER 1-825-E-LC01D	78'	AUX BLDG
264	CLASS 1E	1-825-E-LC02	CLASS 1E AUX. BLDG 480V SWING LOAD CENTER 1-825-E-LC02	78'	AUX BLDG

"D" (13/17)

Table 19.1-42A (13 of 17)

No.	Equip Class	Official Tag #	Equipment Description	Floor Elevation	Building
265	CLASS 1E	1-825-E-TR01A	480V LOAD CENTER XFMR	78'	AUX BLDG
266	CLASS 1E	1-825-E-TR01B	480V LOAD CENTER XFMR	78'	AUX BLDG
267	CLASS 1E	1-825-E-TR01C	480V LOAD CENTER XFMR	78'	AUX BLDG
268	CLASS 1E	1-825-E-TR01D	480V LOAD CENTER XFMR	78'	AUX BLDG
269	CLASS 1E	1-827-E-MC01A	CLASS 1E AUX. BLDG 480V MCC 1-827-E-MC01A	100'	AUX BLDG
270	CLASS 1E	1-827-E-MC01A-3	120/208V AC DIST. PNL	100'	AUX BLDG
271	CLASS 1E	1-827-E-MC01B	CLASS 1E AUX. BLDG 480V MCC 1-827-E-MC01B	100'	AUX BLDG
272	CLASS 1E	1-827-E-MC01B-3	120/208V AC DIST. PNL	100'	AUX BLDG
273	CLASS 1E	1-827-E-MC01C	CLASS 1E AUX. BLDG 480V MCC 1-827-E-MC01C	78'	AUX BLDG
274	CLASS 1E	1-827-E-MC01C-3	120/208V AC DIST. PNL	78'	AUX BLDG
275	CLASS 1E	1-827-E-MC01D	CLASS 1E AUX. BLDG 480V MCC 1-827-E-MC01D	78'	AUX BLDG
276	CLASS 1E	1-827-E-MC01D-3	120/208V AC DIST. PNL	78'	AUX BLDG
277	CLASS 1E	1-827-E-MC02A	CLASS 1E ESW STRUCTURE AREA 480V MCC 1-827-E-MC02A	100'	ESW STRUCT AREA
278	CLASS 1E	1-827-E-MC02A-3	120/208V AC DIST. PNL	100'	ESW STRUCT AREA
279	CLASS 1E	1-827-E-MC02B	CLASS 1E ESW STRUCTURE AREA 480V MCC 1-827-E-MC02B	100'	ESW STRUCT AREA
280	CLASS 1E	1-827-E-MC02B-3	120/208V AC DIST. PNL	100'	ESW STRUCT AREA
281	CLASS 1E	1-827-E-MC02C	CLASS 1E AUX. BLDG 480V MCC 1-827-E-MC02C	78'	AUX BLDG
282	CLASS 1E	1-827-E-MC02C-3	120/208V AC DIST. PNL	78'	AUX BLDG
283	CLASS 1E	1-827-E-MC02D	CLASS 1E AUX. BLDG 480V MCC 1-827-E-MC02D	78'	AUX BLDG
284	CLASS 1E	1-827-E-MC02D-3	120/208V AC DIST. PNL	78'	AUX BLDG
285	CLASS 1E	1-827-E-MC03A	CLASS 1E AUX. BLDG 480V MCC 1-827-E-MC03A	137'	AUX BLDG

"D" (14/17)

Table 19.1-42A (14 of 17)

No.	Equip Class	Official Tag #	Equipment Description	Floor Elevation	Building
286	CLASS 1E	1-827-E-MC03A-3	120/208V AC DIST. PNL	137'	AUX BLDG
287	CLASS 1E	1-827-E-MC03B	CLASS 1E AUX. BLDG 480V MCC 1-827-E-MC03B	120'	AUX BLDG
288	CLASS 1E	1-827-E-MC03B-3	120/208V AC DIST. PNL	120'	AUX BLDG
289	CLASS 1E	1-827-E-MC03C	CLASS 1E AUX. BLDG 480V MCC 1-827-E-MC03C	137'	AUX BLDG
290	CLASS 1E	1-827-E-MC03C-3	120/208V AC DIST. PNL	137'	AUX BLDG
291	CLASS 1E	1-827-E-MC03D	CLASS 1E AUX BLDG 480V MCC 1-827-E-MC03D	137'	AUX BLDG
292	CLASS 1E	1-827-E-MC03D-3	120/208V AC DIST. PNL	137'	AUX BLDG
293	CLASS 1E	1-827-E-MC04A	CLASS 1E AUX. BLDG 480V MCC 1-827-E-MC04A	137'	AUX BLDG
294	CLASS 1E	1-827-E-MC04A-3	120/208V AC DIST. PNL	137'	AUX BLDG
295	CLASS 1E	1-827-E-MC04B	CLASS 1E AUX. BLDG 480V MCC 1-827-E-MC04B	137'	AUX BLDG
296	CLASS 1E	1-827-E-MC04B-3	120/208V AC DIST. PNL	137'	AUX BLDG
297	CLASS 1E	1-827-E-MC04C	CLASS 1E AUX. BLDG 480V MCC 1-827-E-MC04C	100'	AUX BLDG
298	CLASS 1E	1-827-E-MC04C-3	120/208V AC DIST. PNL	100'	AUX BLDG
299	CLASS 1E	1-827-E-MC04D	CLASS 1E AUX. BLDG 480V MCC 1-827-E-MC04D(DIV. II)	100'	AUX BLDG
300	CLASS 1E	1-827-E-MC04D-3	120/208V AC DIST. PNL	100'	AUX BLDG
301	CLASS 1E	1-827-E-MC05A	CLASS 1E EDG-A BLDG 480V MCC 1-827-E-MC05A	100'	EDG BLDG
302	CLASS 1E	1-827-E-MC05A-3	120/208V AC DIST. PNL	100'	EDG BLDG
303	CLASS 1E	1-827-E-MC05B	CLASS 1E EDG-B BLDG 480V MCC 1-827-E-MC05B	100'	EDG BLDG
304	CLASS 1E	1-827-E-MC05B-3	120/208V AC DIST. PNL	100'	EDG BLDG
305	CLASS 1E	1-841-E-BC01A	CLASS 1E BATT. CHARGER (AUX BLDG)	78'	AUX BLDG
306	CLASS 1E	1-841-E-BC01B	CLASS 1E BATT. CHARGER (AUX BLDG)	78'	AUX BLDG

"D" (15/17)

Table 19.1-42A (15 of 17)

No.	Equip Class	Official Tag #	Equipment Description	Floor Elevation	Building
307	CLASS 1E	1-841-E-BC01C	CLASS 1E BATT. CHARGER (AUX BLDG)	78'	AUX BLDG
308	CLASS 1E	1-841-E-BC01D	CLASS 1E BATT. CHARGER (AUX BLDG)	78'	AUX BLDG
309	CLASS 1E	1-841-E-BC02A	CLASS 1E BATT. CHARGER (STAND-BY) (AUX BLDG)	78'	AUX BLDG
310	CLASS 1E	1-841-E-BC02B	CLASS 1E BATT. CHARGER (STAND-BY) (AUX BLDG)	78'	AUX BLDG
311	CLASS 1E	1-841-E-BC02C	CLASS 1E BATT. CHARGER (STAND-BY) (AUX BLDG)	78'	AUX BLDG
312	CLASS 1E	1-841-E-BC02D	CLASS 1E BATT. CHARGER (STAND-BY) (AUX BLDG)	78'	AUX BLDG
313	CLASS 1E	1-841-E-BT01A	CLASS 1E 125V DC BATTERY	100'	AUX BLDG
314	CLASS 1E	1-841-E-BT01B	CLASS 1E 125V DC BATTERY	100'	AUX BLDG
315	CLASS 1E	1-841-E-BT01C	CLASS 1E 125V DC BATTERY	78'	AUX BLDG
316	CLASS 1E	1-841-E-BT01D	CLASS 1E 125V DC BATTERY	78'	AUX BLDG
317	CLASS 1E	1-841-E-MC01A	CLASS 1E 125V DC CONTROL CENTER (AUX BLDG)	78'	AUX BLDG
318	CLASS 1E	1-841-E-MC01A-C1	CLASS 1E 125V DC DISTR. PNL 1	78'	AUX BLDG
319	CLASS 1E	1-841-E-MC01A-D1	CLASS 1E 125V DC DISTR. PNL 2	78'	AUX BLDG
320	CLASS 1E	1-841-E-MC01B	CLASS 1E 125V DC CONTROL CENTER (AUX BLDG)	78'	AUX BLDG
321	CLASS 1E	1-841-E-MC01B-C1	CLASS 1E 125V DC DISTR. PNL 1	78'	AUX BLDG
322	CLASS 1E	1-841-E-MC01B-D1	CLASS 1E 125V DC DISTR. PNL 2	78'	AUX BLDG
323	CLASS 1E	1-841-E-MC01C	CLASS 1E 125V DC CONTROL CENTER (AUX BLDG)	78'	AUX BLDG
324	CLASS 1E	1-841-E-MC01C-D1	CLASS 1E 125V DC DISTR. PNL	78'	AUX BLDG
325	CLASS 1E	1-841-E-MC01D	CLASS 1E 125V DC CONTROL CENTER (AUX BLDG)	78'	AUX BLDG
326	CLASS 1E	1-841-E-MC01D-D1	CLASS 1E 125V DC DISTR. PNL 2	78'	AUX BLDG
327	CLASS 1E	1-842-E-IN01A	CLASS 1E CH.A 40KVA INVERTER (AUX BLDG)	78'	AUX BLDG

"D" (16/17)

Table 19.1-42A (16 of 17)

No.	Equip Class	Official Tag #	Equipment Description	Floor Elevation	Building
328	CLASS 1E	1-842-E-IN01B	CLASS 1E CH.A 40KVA INVERTER (AUX BLDG)	78'	AUX BLDG
329	CLASS 1E	1-842-E-IN01C	CLASS 1E CH.C 40KVA INVERTER (AUX BLDG)	78'	AUX BLDG
330	CLASS 1E	1-842-E-IN01D	CLASS 1E CH.C 40KVA INVERTER (AUX BLDG)	78'	AUX BLDG
331	CLASS 1E	1-842-E-IN02A	CLASS 1E SAFETY MOV INVERTER (RC SYS ONLY)	78'	AUX BLDG
332	CLASS 1E	1-842-E-IN02B	CLASS 1E SAFETY MOV INVERTER 30KVA	78'	AUX BLDG
333	CLASS 1E	1-842-E-IN02C	CLASS 1E SAFETY MOV INVERTER	78'	AUX BLDG
334	CLASS 1E	1-842-E-IN02D	CLASS 1E SAFETY MOV INVERTER 30KVA	78'	AUX BLDG
335	CLASS 1E	1-842-E-TR01A	CLASS 1E REGULATING TRANSFORMER	78'	AUX BLDG
336	CLASS 1E	1-842-E-TR01B	CLASS 1E REGULATING TRANSFORMER	78'	AUX BLDG
337	CLASS 1E	1-842-E-TR01C	CLASS 1E REGULATING TRANSFORMER	78'	AUX BLDG
338	CLASS 1E	1-842-E-TR01D	CLASS 1E REGULATING TRANSFORMER	78'	AUX BLDG
339	-	1-752-J-PA03B	ESF-CCS Group Controller Cabinet (Ch.BE)	157'	AUX
340	-	1-752-J-PA03C	ESF-CCS Group Controller Cabinet (Ch.CE)	157'	AUX
341	-	1-752-J-PA03D	ESF-CCS Group Controller Cabinet (Ch.DE)	157'	AUX
342	-	1-752-J-PA03A	ESF-CCS Cabinet(A, B, C, D)	157'	AUX
343	-	1-752-J-PA14B	PPS Cabinet Ch.B-1	157'	AUX
344	-	1-752-J-PA14C	Plant Protection System Cabinet(C)	157'	AUX
345	-	1-752-J-PA14D	PPS Cabinet Ch.D-1	157'	AUX
346	-	1-752-J-PA14A	Plant Protection System Cabinet(A)	157'	AUX
347	-	1-751-J-PM01	RO Console (Frame)	157'	AUX
348	-	1-751-J-PM02	TO/EO Console (Frame)	157'	AUX
349	-	1-751-J-PM03	SS Console (Frame)	157'	AUX
350	-	1-751-J-PM04	STA Console (Frame)	157'	AUX

"D" (17/17)

Table 19.1-42A (17 of 17)

No.	Equip Class	Official Tag #	Equipment Description	Floor Elevation	Building
351	-	1-751-J-PM05	Safety Console (Frame)	157'	AUX
352	-	-	PARS	Various	CNTMT

Table 19.1-43 (6 of 6)

Component	Location	Failure mode	HCLPF
HVAC Ducting & Dampers	various		(2)
Cable Trays & Supports	various		(2)
Motor Operated Valves	various		(2)
Air Operated Valves	various		(2)
Off-Site Power	various		0.09g(1)
Electrical Conduit	various		(2)
Relief and Check Valves	various		(2)
Resistance Temperature Detectors	various		(2)
Pressure Transmitters	various		(2)

(1) HCLPF based on generic value from Risk Assessment of Operational Events Handbook, volume 2 – External Events, R.1.01, January 2008, USNRC.

(2) The component is assigned to COL item (COL 19.1(8)) and HCLPF value is assumed to be equal to or exceed 1.67 times CSDRS.

(3) ESWIS and CCW Hx Building are assigned to COL item (COL 19-1(~~7~~ 8)) and HCLPF value is assumed to be equal to or exceed 1.67 times GMRS.

EDG* : EDG Building

← Insert "E"

"E" (1/4)

Table 19.1-43A (1 of 4)

LPSD Seismic Fragility Analysis Results Summary

Component	Location	Failure mode	HCLPF (g)
Reactor Containment building	-	Tan. shear fail near the base	0.94
Containment Hatch (Open & Stowed)	CTMT	Movement/Collapse	[1]
Reactor Containment Internal	-	Tan. shear fail near the base	1.09
Auxiliary Building	-	Shear fail of shear wall at the basemat	0.51
Emergeny Diesel Generator Building	-	Shear fail of shear wall at the basemat	0.87
Diesel Fuel Oil Tank Building	-	Shear fail of shear wall at the basemat	0.73
Nuclear Island failure	-	Sliding toward the turbine building	0.52
Turbine Building	-	Collapse into Aux Bldg	[1]
Compound Building	-	Collapse into Aux Bldg	[1]
Reactor Vessel Head (Removed and Stowed)	CTMT	Movement/Collapse	[1]
CVCS Letdown Line Piping	-	Line break	[1]
Regenerative Heat Exchanger	CTMT El. 114'	-	[1]
ESWIS	-	-	[1]
CCW Hx Building	-	-	[1]
Charging Pumps	AB El. 55'	-	[1]
Letdown Heat Exchanger	CTMT El. 100'	-	[1]
Auxiliary Charging Pump	AB El. 55'	-	[1]
Safety Injection Tanks	CTMT. El. 136' 06"	-	[1]
Shutdown Cooling Pumps	AB El. 50'	-	[1]
Shutdown Cooling Heat Exchanger	AB El. 50'	-	[1]
SC Pump Miniflow Heat Exchanger	AB El. 50'	-	[1]
Safety Injection Pump	AB El. 50'	-	[1]
Containment Spray Pump	AB El. 50'	-	[1]
CS Miniflow Hx	AB El. 50'	-	[1]
Containment Spray Heat Exchanger	AB El. 55'	-	[1]

"E" (2/4)

Table 19.1-43A (2 of 4)

Component	Location	Failure mode	HCLPF (g)
AFW Pump-Motor Driven	AB El. 78'	-	[1]
AFW Pump-Turbine Driven	AB El. 78'	-	[1]
Emergency Diesel Generators	EDG El. 100' AB El. 100'	-	[1]
Emergency Diesel Fuel Oil transfer pump	EDG El. 65' AB El. 63'	-	[1]
Starting Air Tank	AB El. 100'	-	[1]
Diesel Fuel Oil Day Tank	EDG El. 121' AB El. 120'	-	[1]
Diesel Fuel Oil Storage Tank	EDG El. 63' Aux. El. 65'	-	[1]
Silencer	AB El. 100'	-	[1]
Air Intake Filter	AB El. 109'	-	[1]
Lube Oil Water Hx	AB El. 100'	-	[1]
Motor Driven Fuel Oil Feed Pump	EDG El. 100' AB El. 100'	-	[1]
Essential Service Water Pump	ESW IS. El. 69'	-	[1]
CCW Heat Exchangers	CCW Hx Bldg El. 100'	-	[1]
CCW Pump	AB El. 55'	-	[1]
CCW Surge Tank	AB El. 172'	-	[1]
Essential Chilled Water Pumps	AB. El. 78'	-	[1]
Essential Chillers	AB El. 78'	-	[1]
ECW Compression Tank	AB El. 172'	-	[1]
ECW Air Separator	AB El. 78'	-	[1]
Essential Chilled Water System Control Panel	AB El. 78'	-	[1]
AFWP Room Cubicle Cooler-MD	AB El. 78'	-	[1]
CCWP Room Cubicle Cooler	AB El. 55'	-	[1]
SI Room Cubicle Cooler	AB El. 50' AB El. 55'	-	[1]
SC Pump & Mini-flow Hx. Room Cubicle Cooler	AB El. 50' AB El. 55'	-	[1]
Mech. Pen. Room Cubicle Cooler	AB El. 100' AB El. 120'	-	[1]

"E" (3/4)

Table 19.1-43A (3 of 4)

Component	Location	Failure mode	HCLPF (g)
CS Pump Room Cubicle Cooler	AB El. 50' AB El. 55'	-	[1]
Aux Charging Pump Room Cubicle Cooler	AB El. 55'	-	[1]
Charging Pump Room Cubicle Cooler	AB El. 55'	-	[1]
Elect. Pen. Room Area Cubicle Cooler	AB El. 120' AB El. 137'6"	-	[1]
Essential Chiller & Pump Cubicle Cooler	AB El. 78'	-	[1]
CCW Hx. Room Supply Fans	CCW Hx B El. 100' CCW Hx El. 126'	-	[1]
ESW Pump Room Supply Fan	ESW IS. El. 90'	-	[1]
EDG Room Emergency Exhaust Fan	EDG El. 100' AB El. 172'	-	[1]
Control Room Emergency Makeup ACU	AB El. 172'	-	[1]
ESF-CCS GC Cabinet	AB El. 156'	-	[1]
ESF-CCS LC Cabinet	AB El. 156' AB El. 137'6"	-	[1]
Plant Protection System Cabinet	AB El. 156'	-	[1]
MCR Operator Consoles	AB El. 156'	-	[1]
MCR Safety Consoles	AB El. 156'	-	[1]
125V DC Battery Chargers	AB El. 78'	-	[1]
SI Inverter	AB El. 78'	-	[1]
120V AC Inverter(VBPSS)	AB El. 78'	-	[1]
Regulating Transformer	AB El. 78'	-	[1]
125V DC Control Center	AB El. 78'	-	[1]
4.16kV MCSG	AB El. 78'	-	[1]
480V Load Center	AB El. 78'	-	[1]
480V MCC(Aux. EL.137'06")	AB El. 137'06"	-	[1]
480V MCC(Aux. EL.120')	AB El. 120'	-	[1]
480V MCC(Aux. EL.100')	AB El. 100'	-	[1]

"E" (4/4)

Table 19.1-43A (4 of 4)

Component	Location	Failure mode	HCLPF (g)
480V MCC(Aux. EL.78')	AB El. 78'	-	[1]
480V MCC(ESW IS EL.100')	ESW IS. El. 90'	-	[1]
Batteries & Racks	AB El. 78' AB El. 100'	-	[1]
BOP Piping & Supports	various	-	[1]
HVAC Ducting & Dampers	various	-	[1]
Cable Trays & Supports	various	-	[1]
Motor Operated Valves	various	-	[1]
Air Operated Valves	various	-	[1]
Off-Site Power	various	Generic	0.09
Electrical Conduit	various	-	[1]
Relief and Check Valves	various	-	[1]
Resistance Temperature Detectors	various	-	[1]
Pressure Transmitters	various	-	[1]
PARS	various	-	[1]

(1) The HCLPF value is assumed to be equal to or exceed 1.67 times CSDRS: HCLPF = 0.5g.