

## 19H Seismic Capacity Analysis

The information in this appendix of the reference ABWR DCD, including all subsections, tables and figures, is incorporated by reference with the following departures.

STD DEP T1 2.15-1

STD DEP Admin

### 19H.3.3 Other Seismic Category I Structures

STD DEP T1 2.15-1

*Seismic category I structures other than the reactor building structures in the ABWR standard plant include the control building structures. ~~and the radwaste building substructures.~~*

*The control building fragility is evaluated using the same procedure described above for the reactor building. The controlling mode of failure is shear of shear walls. Table 19H-5 shows the margin in each of the strength and response factors.*

*~~The radwaste building does not contain safety related equipment and its failure will not lead to core damage. Consequently, an estimate of the radwaste building fragility is not required.~~*

### 19H.4.3 Components

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Refer to changes in Table 19H-1.

Table 19H-1 Seismic Capacity Summary

| Structure/Component   | Failure Mode  | Fragility <sup>1</sup>          |                                      |              |
|---|---|---------------------------------|--------------------------------------|--------------|
|   |   | Capacity <sup>2</sup><br>Am (g) | Combined <sup>3</sup><br>Uncertainty | HCPLF<br>(g) |
| Electric equipment (chatter)<br>function req'd during event<br>function req'd after event   | <del>Relay chattering<sup>4</sup></del><br>Relay chattering <sup>4 5</sup>                                |                                 |                                      |              |
| Switchgear/Motor control centers<br>Manual valves <sup>3 5 4</sup><br>HVAC ducting<br>Air handling units/Room A.C.<br>Piping <sup>3 5 4</sup><br>Diesel-driven pumps <sup>3 5 4</sup> | Functional/Structural <sup>4 5</sup><br>Internal damage<br>Support<br>Blade rubbing<br>Support<br>Support |                                 |                                      |              |

1 Fragility not part of DCD. Refer to SSAR.

2 Capacities are in terms of median peak ground acceleration.

3 Combined uncertainties are composite logarithmic standard deviations of uncertainty and randomness components.

4 Except for ACIWA (fire water) components (Table 19I-1).

5 The potential for relay chatter was treated in the following manner. Only the scram safety function is required during a seismic event. This function is fail-safe, so relay chatter would cause a safe state failure (scram) even if relays were employed. For the ABWR, the scram actuating devices are solid state power switches with no failure mode similar to relay chatter. The scram function is supplemented by an alternate scram method (energizing the air header dump valves) to provide diversity. This method uses relay actuation, but no credit was taken for this capability in the seismic analysis. Therefore, there is no potential for relay chatter to prevent safety actions during a seismic event.

Switchgear and motor control centers do include relays whose failure could prevent safety actions after the seismic event. It was assumed that the indicated capacity of this equipment was more representative than the specific relay chatter value since switchgear and motor control centers are normally qualified with the auxiliary relays in place. Also, the type of auxiliary relays used tend to be the most rugged of relay types and would have a higher capacity. The ~~multiplexer I&C output devices for ECCS and RHR operation have been~~ are assumed to be solid state devices (rather than relays), so the relay chatter failure mode does not apply.

**Table 19H-1a HCLPF Values for Site-Specific SSCs**

| <b>Site-specific SSC</b>                | <b>Governing Failure Mode</b>            | <b>Governing HCLPF</b> | <b>Ratio to GMRS PGA</b> |
|---|--|------------------------|--------------------------|
| UHS/Pump House/Cooling Tower Structure  | Structural failure                       | 0.20 g                 | 2.0                      |
| RSW Piping Tunnel                       | Stability (Overturning)                  | 0.22 g                 | 2.2                      |
| Diesel Generator Fuel Oil Storage Vault | Stability (Sliding)                      | 0.26 g                 | 2.65                     |
| Service Water Cooling Fans              | Functional Failure During the Earthquake | 0.20 g                 | 2.0                      |

