# Soil-Structure Interaction Analyses and Results for the US-APWR Standard Plant

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Soil-Structure Interaction Analyses and Results for the US-APWR Standard Plant

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## Abstract

The purpose of this technical report is to present the soil-structure interaction (SSI) analyses of the US-APWR prestressed concrete containment vessel (PCCV), containment internal structure (CIS), reactor building (R/B), and the power source buildings (PS/Bs) as referenced by US-APWR Design Control Document (DCD), Chapter 3 (Reference 1).

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# List of Acronyms

The following list defines the acronyms used in this document.

three dimensional
auxiliary building
acceleration response spectra
central and eastern North America
containment internal structure
certified seismic design response spectra
Design Control Document
east-west
finite element
Fast Fourier Transformation
fuel handling area
gas turbine generators
in-structure response spectra
north-south
prestressed concrete containment vessel
power source building
reactor building
reactor coolant loop
reactor coolant pump
reactor vessel
refueling water storage pit
single degree of freedom
steam generator
square root sum of the squares
system, subsystem and component
safe shutdown earthquake
soil-structure interaction
turbine building

#### 1.0 INTRODUCTION

This report documents the soil-structure interaction (SSI) analyses of the prestressed concrete containment vessel (PCCV), containment internal structure (CIS), reactor building (R/B) including the fuel handling area (FH/A), referred to as the R/B complex in the following text; and the east and west power source buildings (PS/Bs) of the US-APWR standard plant.

As stated in US-APWR Design Control Document (DCD) Subsection 3.7.2.4 (Reference 1), SSI effects are considered in the seismic response analysis of all major seismic category I and seismic category II buildings and structures that are part of the US-APWR standard and non-standard plant. The ACS SASSI computer program (Reference 2) is the SASSI computer program that has been used for the SSI analyses described in this report. The SSI analyses are conducted using methods and approaches consistent with ASCE 4-98 (Reference 3).

#### 2.0 DESCRIPTION OF US-APWR STANDARD PLANT STRUCTURES

#### 2.1 Reactor Building Complex

A common power block foundation basemat supports the R/B, as well as the PCCV and CIS. This complex of structures includes the following functional areas.

- PCCV and CIS, including the internals coupled with the reactor coolant loops (RCL)
- Safety system pumps and heat exchangers area
- Fuel handling area
- Main steam and feed water area
- Safety-related electrical area

The common foundation of the R/B Complex, located at a depth of 38'-10" from plant grade, is 213'-4" x 308'-11" in plan dimensions and varies in thickness from 9'-11" at the edges to 38'-2" at the center where the containment structure is located. Table 3-1 provides a summary of the R/B complex main dimensions. Expansion joints separate the R/B complex basement from the foundations of the surrounding buildings, turbine building (T/B), auxiliary building (A/B), east and west PS/Bs. The gap distance of the expansion joints is dimensioned to prevent contact between the building as result of the seismic structural displacements and/or differential settlement of the buildings foundations. The north and partially the west exterior walls of the R/B complex basement are in contact with embedment soil.

Although the R/B, CIS and PCCV structures are supported on the common basemat, they are independent free standing structures above the basemat. The R/B is a five-story reinforced concrete structure extending 180'-10" above the basemat. The R/B structure consists primarily of shear walls and reinforced concrete floor diaphragms. It envelops a free-standing containment at its center.

The PCCV is a vertically oriented cylindrical structure with an inside diameter of 149'-2". It extends from the basemat to an inside height of 226'-5" where a 3'-8" thick hemispherical dome comprises the roof structure. The vertical cylindrical walls are 4'-4" thick and accommodate the equipment hatch and personnel airlocks. The PCCV is circumferentially and vertically post-tensioned with unbonded tendons. The CIS include the refueling water storage pit (RWSP), reactor cavity, refueling cavity, refueling canal, operating deck, and major piping, mechanical, and electrical penetrations.

The US-APWR is a four loop plant with four safety trains. Each RCL consists of the reactor vessel (RV), the steam generator (SG), the reactor coolant pump (RCP), and the loop piping. The loop piping consists of hot leg, crossover leg and cold leg piping in which the coolant flows from RV to SG, from SG to RCP, and from RCP back to RV, respectively.

#### 2.2 Power Source Buildings

The plan dimension of each PS/B is 114'-10" x 69'-4". Table 3-2 provides a summary of the PS/B main dimensions. Each PS/B is a reinforced concrete structure consisting of vertical

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shear/bearing walls and horizontal slabs with one floor level under ground and the main floor level above ground. The walls carry the vertical loads from the structure to the basemat. Lateral loads are transferred to the walls by the roof and floor slabs.

The west PS/B borders the R/B, A/B, and T/B, the east PS/B borders the R/B and the T/B. Each PS/B rests on its own basemat. Each PS/B is designed with an expansion joint along its interface with the R/B to assure that no contact will occur between the buildings under a seismic or any other design basis loading including differential settlement of the foundation. The expansion joint is sized to prevent contact between the structures even if the maximum translational and rotational displacements due to a seismic loading (and other design basis loading) were to occur.

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#### 3.0 US-APWR SEISMIC DESIGN BASES

#### 3.1 SSI Analysis Methodology

The ACS SASSI computer program (Reference 2) has been used as the computer program for the SSI analyses of US-APWR R/B complex. The program employs the complex response method and finite element (FE) technique to solve for the seismic response of the SSI system in frequency domain. The response is calculated at selected frequency of analysis and then interpolated for the range of frequency of interest. The plots of transfer functions amplitudes for the response at major floor mass nodes serve as check of the adequacy of the selected frequencies of analyses and the accuracy of the transfer function interpolation. The Fast Fourier Transformation (FFT) and inverse FFT technique is used to transform the input motion and the nodal responses of the system between frequency and time domain. The number of FFT points is set to 16384 for the R/B complex model and 8192 for the PS/B model.

The maximum frequency of analysis is determined from the rule in Reference 2 that the size of the soil layers or the FE elements in contact with soil should not be bigger than 20% of the wave length of the soil material. When the inertial property of the soil material is modeled using one-half the lumped-mass model and one-half the consistent-mass model, the maximum frequency of analysis  $f_n$  is calculated as follows:

$$f_n = \frac{Vs}{5 \cdot d}$$
 (Equation 1)

where  $V_s$  is the shear wave velocity of the soil and d is either the thickness of the soil layer or the maximum size of the FE mesh of the structural model at the soil-structure interaction interface. The analysis results are checked to ensure that the maximum frequency of analysis captures the critical seismic response.

The SASSI analysis employs the numerical Green's function method to obtain the SSI impedance. All the nodes at the contact of the building basement with the subgrade serve as interaction nodes. The design earthquake is input at the foundations bottom nominal elevation of -36'-3". S-waves propagating upward represent the two horizontal components of the design earthquake motion H1 and H2 that are applied in north-south (NS), east-west (EW) direction, respectively. The vertical component of the design earthquake motion V is represented by vertically propagating P-waves. The three components of the earthquake are applied to the models separately.

#### 3.2 Site Conditions

Technical Report MUAP-10001 (Reference 4) provides input soil/rock properties for the SSI analyses that are compatible with the strains generated by the input ground motion and envelope the effects of geological, geotechnical, and hydrological site parameters for representative nuclear power plant sites within the continental US. A set of eight (8) generic layered profiles are selected for SSI analyses, which strain-compatible properties, shear-wave (Vs) and compressional-wave (Vp) velocities and corresponding hysteretic damping values provide a wide variation of properties that addresses soil properties for typical sites across central and eastern North America (CENA).

The SSI analyses performed for the set of eight generic layered soil profiles consider the

effects of frequency dependence of SSI for layered sites. The elevation of groundwater table is also considered in these analyses. The basements of the R/B complex and PS/Bs are separated from the buildings around them by expansion joints to prevent their interaction during an earthquake. Portions of the R/B complex and PS/Bs basements are in direct contact with the embedment soil. The SSI analyses performed for the generic sites consider the common basemat of the R/B complex and the basemats of the PS/B resting on the surface of the subgrade located approximately 40 feet below the plant nominal ground surface elevation. The embedment effects are addressed on site-specific basis as mandated by Subsection 3.7.2.4 of the US-APWR DCD (Reference 1).

The site models in the ACS SASSI (Reference 2) analyses use infinite horizontal layers to represent the top of at least 600 feet and 250 feet of subgrade materials for the R/B complex and PS/B, respectively. An elastic half-space that is modeled by an additional 10 elasto-plastic layers represents the dynamic properties of the subgrade located at least 600 feet and 250 feet below the foundation elevation for the R/B and PS/B, respectively. Tables 3-3A through 3-3H present the input material properties of the subgrade. The layering of the subgrade is adjusted to ensure that the thickness of the soil layers is not more than 20% of the minimum wave length corresponding to the selected maximum frequency of analysis. Table 3-4 provides the maximum frequency of analysis for the eight generic subgrade profiles considered in the site-independent SSI analyses.

#### 3.3 Input Ground Motion

Technical Report MUAP-10001 (Reference 4) provides a set of three statistically independent acceleration time histories, H1, H2, and V representing the input ground motion in NS, EW, and vertical direction, respectively. The acceleration time histories are compatible to the US-APWR certified seismic design response spectra (CSDRS) and in compliance with the requirements of NUREG-0800 Standard Review Plan (SRP) 3.7.1 (Reference 5), Subsection 3.7.1.II.1B, Option 1 Approach 2.

Figure 3-1 presents the 5% damping horizontal and vertical CSDRS. Figure 3-2 presents the three acceleration time histories used as input ground motion for site independent SSI analyses. The time step and duration of the acceleration time histories is 0.005 second and 22.005 seconds, respectively. The corresponding frequency step is 0.0122 Hz.

#### 3.4 Structural Models

Technical Report MUAP-10001 (Reference 4) describes the development and validation of the ACS SASSI models of the R/B complex and PS/B. The validation analyses presented in the report, ensure the accuracy of the ACS SASSI models of the R/B complex and PS/B and demonstrate that the modeling requirements of SRP 3.7.2 (Reference 6), Section II 1.A(iv) are met.

#### 3.4.1 R/B Complex Structural Model

The ACS SASSI structural model of R/B complex consists of the FE model representing the dynamic properties of the basement shear walls and basemat, and the lumped-mass stick models representing the dynamic properties of the major equipment and building structures above grade. Figure 3-3 shows the ACS SASSI model used for SSI analyses of the R/B complex. Lumped mass stick models represent the stiffness and mass inertia properties of

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the R/B including FH/A, PCCV, and CIS coupled with the RCL. Lumped mass stick models of the RV and the four SG and RCP are included in the RCL model as described in MUAP-10001.

In MUAP-10001, the capability of the lumped-mass stick models to capture high frequency responses have been enhanced by incorporating single degree of freedom (SDOF) models to capture the out-of-plane response of flexible floors and slabs. The stiffness of the structural members subjected to high stresses under the most critical seismic load combination has been adjusted to take in account effects of concrete cracking. The site-independent SSI analyses use two structural models of the R/B complex with different mesh of the basement FE model. The geometry, stiffness and mass inertia properties of the basement FE models are identical. The only difference between the models is in the nominal size of the basement mesh that is set to 10 ft and 14 ft in order to ensure that the size of the basemat FE mosh meets the maximum frequency requirements for different subgrade stiffness conditions and minimize the required computer run time. Table 3-4 presents the maximum frequency of analyses.

Table 3-1 presents the main dimensions and elevations defining the R/B complex geometry. Table 3-5 provides the weight of the main building structures and components. The safe shutdown earthquake (SSE) values of material damping presented in Table 3-7 are assigned to the R/B complex model. Table 3-8 provides the fixed base natural frequencies of the PCCV, CIS and R/B lumped mass stick models. Table 3-4 presents the maximum frequencies of analyses of the R/B Complex basement FE model for different generic site profiles considered. Appendix A of this Report provides the numbering of the nodes of the two models used for site specific SSI analyses of R/B complex. Detailed description of the structural model and information about its properties are provided in MUAP-10001.

#### 3.4.2 PS/B Structural Model

The SSI analyses of the east and west PS/B use a three dimensional (3-D) FE model shown in Figure 3-6 to represent the dynamic properties of the PS/B structure. The model reflects the geometry and dynamic properties of the west PS/B but is also used for the site-specific analyses of the east PS/B since the buildings are nearly identical.

The PS/B models use shell elements to represent the stiffness and inertia properties of structural walls and slabs, including the floor slabs and roof slabs. The properties of the shell elements are adjusted to consider the effect of the concrete cracking on the out-of-plane stiffness of the slab elements. The mass density properties of the slab shell elements are adjusted to include the mass of the equipment, the mass associated with additional dead and live loads. The mass of the equipment is distributed over a representative floor area or equipment support footprint area. Beam elements model the structural beams and columns of the PS/B. Solid brick elements with eight (8) nodes represent the basemat of the building. At the connections between the basemat and the walls, the shell elements extend into the basemat solid elements to transmit nodal rotations. The extended elements share nodes with the corresponding face of the solid elements but have no mass.

The major dimensions that define the geometry of the FE model are listed in Table 3-2. Table 3-6 presents the weights of the PS/B, and Table 3-7 presents the material properties of the PS/B reinforced concrete structural members. Table 3-8 provides a summary of the

building fixed base modal properties in terms of natural frequencies of the first five major modes of vibration. Table 3-4 presents the maximum frequencies of analyses of the PS/B FE model for the different generic site profiles considered. Appendix A provides a list of representative node locations of the PS/B FE model. Detailed description of the structural model and its dynamic properties are provided in MUAP-10001.

#### 3.5 Computation of In-Structure Response Spectra (ISRS)

In-structure response spectra (ISRS) are generated for various areas of the R/B complex and PS/B in accordance with US NRC RG 1.122 (Reference 7) to serve as the seismic design basis for design of category I and II systems, subsystems and components (SSCs). The SASSI analyses provide results for the response of the PCCV, CIS, R/B and PS/B structures due to the three components of the design earthquake for each of the eight site profiles. At representative node locations, 5% damping acceleration response spectra (ARS) in the three orthogonal directions are calculated for each of the three directions of the input ground motion. The ARS are calculated at 301 frequency points equally distributed on the logarithmic scale at the range of frequency from 0.1 Hz to 100 Hz. The responses obtained for the three directions of the input ground motion are combined using the square root sum of the squares (SRSS) method as follows:

$$ARS_{X} = \sqrt{ARS_{XX}^{2} + ARS_{YX}^{2} + ARS_{ZX}^{2}}$$

$$ARS_{y} = \sqrt{ARS_{Xy}^{2} + ARS_{Yy}^{2} + ARS_{Zy}^{2}}$$
(Equation 2)
$$ARS_{Z} = \sqrt{ARS_{XZ}^{2} + ARS_{YZ}^{2} + ARS_{ZZ}^{2}}$$

where:

- ARS<sub>(m)(n)</sub> are the SASSI ARS results for the response in "n" direction due to earthquake in "m" direction,
- ARS<sub>X</sub>, ARS<sub>Y</sub> and ARS<sub>Z</sub> are the combined ARS of the structural response in NS (x), EW (y), and vertical (z) direction.

The results for SRSS-combined ARS at each representative node location obtained from the results of the ACS SASSI analyses of each of the eight generic site conditions presented in Section 3.2 (270-500, 270-200, 560-100, 560-200, 560-500, 900-200, 900-100, 2032-100) are then enveloped. The enveloped ARS are then combined as described below to obtain the combined ARS for the response at different locations within the R/B complex and PS/B. The ISRS are developed by broadening the combined ARS by 15% to account for uncertainties in the analysis parameters. Figure 3-4 and 3-5 demonstrate how the eight soil conditions are enveloped and broadened for a sample nodal mass point.

Table 3-9 and Table 3-10, respectively, provide a list of the ISRS of the response of the PCCV and CIS. The ISRS representing the responses of the PCCV in all three directions are obtained directly by broadening the ARS of the responses at the lump mass nodes. The ISRS for CIS response are obtained by enveloping the ARS calculated at lumped mass nodes

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with the ARS at locations as shown in the last column of Table 3-10. One set of three ISRS represent the response of the steam generators (ICSGOR) at elevation 112'-0", and the pressurizer at three elevations (ICP1OR, ICP2OR, and ICP3OR) in three orthogonal directions.

Table 3-11 and Table 3-12 list the ISRS representing the response of the R/B. The ISRS provided in Table 3-11 represent the horizontal and vertical out-of-plane response of the rigid slabs and walls. These are obtained by enveloping the ARS calculated at the floor lumped mass location and the ARS at outrigger locations as shown in the last column of Table 3-11. The ISRS representing the out-of-plane response of R/B flexible slabs, roofs and walls are provided in Table 3-12. These ISRS represent the response at the specified location in only one direction, vertical for the flexible slabs and horizontal for the walls. They are generated from the ARS results for the response of the SDOF elements. The SDOF ARS results are grouped together as described in the last column of Table 3-12 based on the location and the characteristics of the SDOF response. The grouped SDOF ARS are then enveloped to generate the ISRS that represent the response of the R/B structure at a particular zone. Table 3-12 and the figures in Appendix B of this Report describe the location of the flexible floor and slab zones and the SDOF elements that contribute to each zone.

The ISRS for design of category I and II SSCs are developed from the ARS response at selected representative node locations of the PS/B FE model. For each major floor of the PS/B (basement, ground floor slab, and roof) two horizontal ISRS are developed in NS and EW direction. These ISRS envelop the ARS response at several representative locations within each floor elevation, including the corners of the building. The two vertical ISRS for the basemat and the roof are developed in a similar manner. Four vertical ISRS serve for the design of each of the three category I gas turbine generators (GTG) and the GTG panels. The vertical GTG ISRS are developed as an average of the vertical response at two representative FE nodes within the GTG footprint area. Table 3-13 list the ISRS representing the response of the PS/B. The nodes that are used for development of ISRS are listed in the last column of the table. Appendix A provides the coordinates of these nodes.

#### 3.6 Computation of Seismic Loads

#### 3.6.1 R/B Complex Seismic Loads

The SSI analyses using the lumped-mass-stick models of the R/B complex provide the maximum member forces/moments in the stick elements. These results are used as basis for development of the SSE design loads for the standard seismic design of the R/B complex structures. The SSI results for maximum accelerations at basement lumped mass nodes (CV00, IC00, RE00 and BS01) are used to evaluate the seismic design loads for the portion of the building below ground elevation. The following is the procedure used for calculation of seismic loads in terms of equivalent static loads for each major floor elevation:

- 1. Develop shear forces, axial force, bending moments and torsional moment diagrams from the results of SSI analyses of each generic soil profile for maximum member forces and moments in the stick elements.
- 2. Develop equivalent horizontal loads  $F_{Hi}$  in NS and EW direction from the shear force diagrams for each floor elevation as shown in Figure 3-7.

- 3. Develop equivalent vertical loads  $F_{Vi}$  from the axial force diagram for each floor elevation as shown in Figure 3-7.
- 4. Develop equivalent floor rocking moment  $M_{Ri}$  in NS and EW direction from the bending moments diagrams for each floor elevation as shown in Figure 3-7.
- 5. Develop equivalent floor torsional moment  $M_{Ti}$  from the torsional moments diagrams for each floor elevation as shown in Figure 3-7.
- 6. Use the SRSS method to combine the seismic demands that are due to three components of the earthquake.
- 7. Envelope the SRSS seismic demands from the SSI analyses of the eight generic soil profiles.
- 8. Adjust the magnitude of the vertical load  $F_V$  to include the effect of the floor rocking using the following equation:

$$F_{V}^{'} = \sqrt{F_{V}^{2} + \left(\frac{M_{NS}}{L_{NS}}\right)^{2} + \left(\frac{M_{EW}}{L_{EW}}\right)^{2}} \quad (\text{Equation 3})$$

where  $M_{NS}$  and  $M_{EW}$  are the floor rocking moments in NS and EW direction and the  $L_{NS}$  and  $L_{EW}$  are the NS and EW length of the floor.

 Adjust the magnitude of the horizontal floor loads F<sub>H</sub> to include the effect of the floor torsional response M<sub>T</sub> using the following equation:

$$F'_{NS} = F_{NS} + \frac{M_T}{L_{EW}}$$
  $F'_{EW} = F_{EW} + \frac{M_T}{L_{NS}}$  (Equation 4)

- 10. Select magnitudes of story loads based on enveloped values of F'<sub>V</sub> and F'<sub>NS</sub> F'<sub>EW</sub> and divide them by the corresponding floor weights to convert the loads in terms of equivalent static accelerations floor loads.
- 11. Envelope the results obtained from the SSI analyses of eight generic soil profiles for maximum accelerations at SDOF masses to develop the magnitudes of the out-of-plane loads on flexible slabs and walls. The out-of-plane loads are grouped as shown in Table 3-12 in the same slab/wall areas as the ISRS.

#### 3.6.2 PS/B Seismic Loads

The results obtained from the site-independent SSI analyses for maximum nodal accelerations serve as basis for development of the seismic loads used for the standard design of PS/B structural members. These seismic design loads are developed in the form of equivalent static accelerations as follows:

1. Calculate maximum accelerations in each of the 3 response directions due to each of the 3 direction input motions from the site-independent SSI analyses of PS/B.

- 2. Envelope the maximum nodal accelerations results obtained from the site-independent SSI analyses of eight generic site conditions.
- 3. Create nine (9) plots of the envelope maximum accelerations in three directions representing the response of the PS/B at particular floor elevation due to the three components of the earthquake.
- 4. Apply the SRSS rule to combine the enveloped nodal maximum accelerations due to the three directions of the earthquake and plot the SRSS of the maximum acceleration responses in the three directions.
- 5. Calculate weighted average accelerations at floor elevation "f" as follows:

$$A_{i}^{f} = \frac{\sum a_{i}^{k} \cdot w_{k}}{W_{f}}$$
 (Equation 5)

where  $W_f$  is the total weight of the floor "f",  $w_k$  is the weight participating to node "k",  $A_i^f$  is the weighted average acceleration of floor "f" in "i' direction, and  $a_i^k$  is the maximum SRSS acceleration at node "k" in "i' direction.

- 6. Determine equivalent seismic demand at each floor elevation based on the maximum acceleration plots and the weighted average accelerations obtained from items 3, 4 and 5.
- 7. Determine the out-of-plane seismic demands on slabs and walls with large unsupported areas based on the plots of the maximum acceleration plots obtained in step 4.
- 8. Calculate story shear diagram for the PS/B structure. The total shear at each floor elevation is obtained as the sum of the all nodal inertial forces at and above that elevation. The nodal inertial forces are the product of the nodal mass and the equivalent static acceleration acting on the node.

### 3.6.3 Seismic Dynamic Earth Pressures

The standard seismic design of the US-APWR R/B complex and PS/Bs is based on the analyses performed on surface-founded structure models that do not account for the support provided by the embedment soil surrounding the basements of the buildings. The dynamic earth pressure is determined so that the exterior walls of the basements are designed to withstand the earth pressures generated by the surrounding soil. The magnitude and distribution for the horizontal dynamic earth pressure are determined using Wood's soil pressure distributions as presented in Figure 3.5-1 of ASCE 4-98 (Reference 3). The effect of the vertical earthquake on the lateral dynamic earth pressure is also considered.

The dynamic earth pressure load calculated as described below is used for the site-independent the exterior walls of the basements to ensure that they can withstand the earth pressures generated by the surrounding soil.

 Calculate the horizontal earthquake excitation induced lateral pressure, denoted as p<sub>sh</sub>, by interpolating and applying ASCE 4-98 Figure 3.5-1 for following soil and seismic parameters:

> Poisson ratio v=0.4Soil unit weight (saturated/total)  $\gamma=$  130 pcf Wall height H= 38.83 ft

Horizontal seismic coefficient  $\alpha$ h=0.3

It is noted that using soil saturated unit weight assumes that the pore water will move with the soil during earthquake shaking, and the inertial force is proportional to the total vertical stress (weight) acting on the embedment soil.

2. The dynamic lateral earth pressure, at a depth of z from the ground surface, denoted as  $p_{sv}$ , is calculated as:

$$p_{sv} = \alpha_v K_0 * \gamma * z$$
 (Equation 6)

where:  $\gamma$  is total unit weight of soil (130 psf), k<sub>0</sub> = 0.5 is the coefficient at-rest of the soil and  $a_v$ =0.3 is the vertical seismic coefficient.

3. An additional design margin of 20% is added to the combined dynamic soil pressure to account for the uncertainties related to the input embedment soil properties and the applied methodology. Therefore, the total dynamic earth lateral pressure on the exterior walls is calculated as follows:

 $P_s = 1.2 (p_{sh}+p_{sv})$  (Equation 7)

for the US-APWR Standard Plant

#### 4.0 SSI ANALYSIS RESULTS

A set of site-independent SSI analyses are performed on the ACS SASSI models of R/B complex and PS/B resting on the surface of eight generic subgrade profiles. Table 3-4 provides a list of the SSI analyses and information regarding the number of frequencies of analyses and cut-off frequency. The results of the site-independent SSI analyses serve as basis for development of parameters for design of the structural members and the seismic category I systems, components and equipment of R/B complex. The text below provides the developed seismic design parameters used for the standard seismic design of US-APWR R/B complex and PS/Bs. Appendix G summarizes the results for maximum accelerations, displacements and stick member forces obtained from the site-independent analyses of the R/B complex and PS/B for the different generic site conditions considered.

#### 4.1 In-Structure Response Spectra (ISRS)

ISRS are generated for various areas of the R/B complex and PS/B following the methodology described in Section 3.5. The ISRS define the seismic demands for standard design of category I and II SSCs. Appendix C, Appendix D and Appendix E provide the 5% damping ISRS for the PCCV, CIS and R/B, respectively. Appendix B provides drawings showing the location within R/B and FH/A where the ISRS in Appendix E representing the response of flexible walls and slabs are applicable. Appendix F presents the 5% damping ISRS for the PS/B.

#### 4.2 Maximum Displacements

Table 4-1, Table 4-2 and Table 4-3 provide the maximum displacements of the PCCV, CIS and R/B relative to the free field that are obtained as envelopes of the results obtained from the SSI analyses of the R/B complex resting on the surface of the eight generic soil profiles. The maximum displacements of PS/B relative to the free filed motion are presented in Table 4-4.

The expansion joints size is determined by considering, at all potential interaction locations, the absolute summation of the deflection associated with each super-structure, obtained from the results of the site-specific SSI analyses of those structures. The maximum displacement results obtained from the SSI analyses presented in Table 4-1 and 4-3 show that at operating floor elevation, the seismic displacements of the PCCV and R/B structure relative to the top of PCCV foundation are:

 $\sqrt{(1.034 - 0.732)^2 + (1.165 - 0.738)^2} = 0.523$ in PCCV at node CV04  $\sqrt{(0.968 - 0.732)^2 + (1.090 - 0.738)^2} = 0.424$ in R/B at node RE03

This demonstrates that the 4 in gap between the two structures is sufficient to prevent interaction between them during design seismic event. Table 4-3 and Table 4-4 show that the maximum displacements of the R/B and PS/B relative to the free field motion at PS/B roof elevation are both less than 1 in, thus demonstrating that the 4 in gap between the building is sufficient to prevent the interaction between them in event of design earthquake.

#### 4.3 SSE Loads

The SSE loads used for seismic design of R/B complex structural members are developed following the methodology described in Section 3.6. Table 4-5, Table 4-6 and Table 4-7 provide the SSE design loads that are used for design of PCCV, CIS and R/B structural members, respectively. Table 4-13, Table 4-14 and Table 4-15 present the shear and axial force diagrams resulting from the design seismic loads being applied on the lumped mass stick models of the PCCV, CIS and R/B, respectively. The out-of-plane SSE loads that in the standard design are applied on the flexible slabs and walls of the R/B and FH/A are shown in Tables 4-8 and 4-9.

Table 4-10 and 4-11 provide the seismic loads for standard design of PS/B structural members. The load magnitudes listed in Table 4-11 represent the loads acting in out-of-plane direction on the flexible slabs and walls. Bubble plots of PS/B seismic demand accelerations are found in Appendix H. Table 4-16 presents the shear force diagrams resulting from the design seismic loads being applied on the PS/B.

The SSE loads are provided in terms of quasi-static acceleration loads. The values of the SSE loads represent the envelope of the structural demands obtained from the SSI analyses of the R/B complex and PS/B of the eight generic soil profiles and are rounded up in order to include at least 5% additional design margin.

Table 4-12 presents the dynamic earth pressure load used for the design of the exterior walls of R/B complex and PS/B basement. The dynamic earth pressures are calculated following the methodology described in Section 3.6.3.

#### 5.0 CONCLUSION

This report has presented the SSI analyses of the R/B complex and PS/Bs for a set of eight generic site conditions that envelope the conditions at wide variety of sites within continental USA. The SSI analyses consider a variety of SSI effects such as layering of the subgrade, the frequency dependence of SSI and elevation of the water table. The results of SSI analyses serve as basis for development of seismic design parameters used for the standard design of the US-APWR category I buildings. This report presents the seismic design loads used for the standard design of the structural members of the R/B complex and the east and west PS/Bs. The 5% damping ISRS are presented that define the seismic loads at different locations within the buildings for standard design of category I and II systems, subsystems and components.

#### 6.0 REFERENCES

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- 2. <u>ACS SASSI, NQA Copy 5 WGI, WGI PO 136-4359</u>, Version 2.2, Ghiocel Predictive Technologies, Inc., 7/23/2007.
- 3. <u>Seismic Analysis of Safety Related Nuclear Structures</u>, American Society of Civil Engineers, ASCE 4-98, Reston, Virginia, 2000.
- 4. <u>Seismic Design Bases of the US-APWR Standard Plant</u>, MUAP-10001, Revision 1, Mitsubishi Heavy Industries, Ltd., April 2010.
- 5. <u>Seismic Design Parameters</u>, NUREG-0800, SRP 3.7.1, Rev. 3, U.S. Nuclear Regulatory Commission, Washington, DC, March 2007.
- 6. <u>Seismic System Analysis</u>, NUREG-0800, SRP 3.7.2, Rev. 3, U.S. Nuclear Regulatory Commission, Washington, DC, March 2007.
- 7. <u>Development of Floor Design Response Spectra for Seismic Design of Floor-Supported</u> <u>Equipment or Components</u>, Regulatory Guide 1.122, Rev. 1, U.S. Nuclear Regulatory Commission, Washington, DC, February 1978.

ltem	Value
Basemat Length in N-S Direction	308'-11"
Basemat Length in E-W Direction	213'-4"
PCCV Foundation Diameter	187'-0"
PCCV Foundation Thickness <sup>(1)</sup>	23'-9" / 39'-10"
R/B Basemat Thickness	9'-11"
Basement Exterior Wall Thickness <sup>(1)</sup>	3'-4" / 3'-8"
Nominal Basemat Bottom Elevation	-36'-3"
Nominal Ground Elevation	2'-7"
PCCV Dome Top Elevation	232'-0"
FH/A Roof Elevation	154'-6"

## Table 3-1 Main Model Dimensions of the R/B Complex

<sup>(1)</sup> Thickness varies

Item	Value
Basemat Length in N-S Direction	69'-4"
Basemat Length in E-W Direction	114'-10"
Basemat Thickness	9'-11"
Basement Exterior Wall Thickness	2'-8"
Nominal Basemat Bottom Elevation	-36'-3"
Nominal Ground Elevation	2'-7"
Main Roof Slab Top Elevation (not including roof appurtenances)	39'-6"

Table 3-2 Main	Model	Dimensions	of PS/B

Layer	Thicknes s	Depth	Unit Weight	Vs	Vp	Poisso	Damp.
#	[ft]	[ft]	kcf	ft/sec	ft/sec	n Ratio	%
1	4.29	0.0	0.125	1242	5498	0.473	3.34
2	4.29	4.3	0.125	1242	5498	0.473	3.34
3	4.29	8.6	0.125	1300	5730	0.473	3.39
4	4.29	12.9	0.125	1300	5730	0.473	3.39
5	4.29	17.2	0.125	1300	5730	0.473	3.39
6	4.29	21.5	0.125	1302	5779	0.473	3.55
7	4.29	25.7	0.125	1302	5779	0.473	3.55
8	4.29	30.0	0.125	1297	5785	0.474	3.75
9	4.29	34.3	0.125	1297	5785	0.474	3.75
10	4.29	38.6	0.125	1273	5744	0.474	3.96
11	4.69	42.9	0.125	1317	5904	0.474	2.92
12	4.69	47.6	0.125	1317	5904	0.474	2.92
13	4.69	52.3	0.125	1362	6102	0.474	2.93
14	4.69	57.0	0.125	1362	6102	0.474	2.93
15	4.69	61.7	0.125	1303	5898	0.474	3.15
16	4.69	66.4	0.125	1303	5898	0.474	3.15
17	4.69	71.0	0.125	1320	5987	0.474	3.18
18	4.69	75.7	0.125	1320	5987	0.474	3.18
19	4.69	80.4	0.125	1338	6081	0.475	3.21
20	4.69	85.1	0.125	1338	6081	0.475	3.21
21	4.69	89.8	0.125	1359	6179	0.475	3.23
22	4.69	94.5	0.125	1359	6179	0.475	3.23
23	5.00	99.2	0.131	1488	6666	0.474	2.94
24	5.00	104.2	0.131	1488	6666	0.474	2.94
25	5.00	109.2	0.131	1482	6663	0.474	3.00
26	5.00	114.2	0.131	1482	6663	0.474	3.00
27	5.00	119.2	0.131	1493	6725	0.474	3.03
28	5.00	124.2	0.131	1493	6725	0.474	3.03
29	5.00	129.2	0.131	1411	6424	0.475	3.27
30	5.00	134.2	0.131	1411	6424	0.475	3.27
31	5.00	139.2	0.131	1447	6578	0.475	3.24
32	5.00	144.2	0.131	1447	6578	0.475	3.24
33	5.00	149.2	0.131	1475	6698	0.475	3.24
34	5.00	154.2	0.131	1475	6698	0.475	3.24
35	5.30	159.2	0.131	1547	6991	0.474	3.13
36	5.30	164.5	0.131	1547	6991	0.474	3.13
37	5.30	169.8	0.131	1655	7180	0.472	2.64
38	5.30	175.1	0.131	1655	7180	0.472	2.64
39	5.75	180.4	0.131	1633	7118	0.472	2.72
40	5.75	186.1	0.131	1633	7118	0.472	2.72

 Table 3-3A Subgrade Properties 270-500 Generic Profile

Layer	Thicknes s	Depth	Unit Weight	Vs	Vp	Poisso n Ratio	Damp.
#	[ft]	[ft]	kcf	ft/sec	ft/sec		%
41	5.75	191.9	0.131	1640	7153	0.472	2.75
42	5.75	197.6	0.131	1640	7153	0.472	2.75
43	8.83	203.4	0.131	1686	7344	0.472	2.71
44	8.83	212.2	0.131	1686	7344	0.472	2.71
45	8.83	221.0	0.131	1640	7182	0.473	2.84
46	8.83	229.9	0.131	1640	7182	0.473	2.84
47	8.83	238.7	0.131	1666	7305	0.473	2.84
48	8.83	247.5	0.131	1666	7305	0.473	2.84
49	9.12	256.4	0.131	1688	7411	0.473	2.85
50	9.12	265.5	0.131	1688	7411	0.473	2.85
51	9.12	274.6	0.131	1718	7535	0.473	2.86
52	9.12	283.7	0.131	1718	7535	0.473	2.86
53	9.12	292.8	0.131	1763	7722	0.472	2.83
54	9.12	302.0	0.131	1763	7722	0.472	2.83
55	9.12	311.1	0.131	1759	7724	0.473	2.87
56	9.12	320.2	0.131	1759	7724	0.473	2.87
57	10.00	329.3	0.131	1751	7705	0.473	2.92
58	10.00	339.3	0.131	1751	7705	0.473	2.92
59	10.00	349.3	0.131	1778	7823	0.473	2.92
60	10.00	359.3	0.131	1778	7823	0.473	2.92
61	10.00	369.3	0.131	1794	7894	0.473	2.93
62	10.00	379.3	0.131	1794	7894	0.473	2.93
63	10.00	389.3	0.131	1780	7850	0.473	2.99
64	10.00	399.3	0.131	1780	7850	0.473	2.99
65	10.00	409.3	0.131	1764	7803	0.473	3.04
66	10.00	419.3	0.131	1764	7803	0.473	3.04
67	10.00	429.3	0.131	1794	7919	0.473	3.02
68	10.00	439.3	0.131	1794	7919	0.473	3.02
69	10.40	449.3	0.131	1781	7884	0.473	3.05
70-82	12.50	459.7	0.134	1781	7423	0.390	0.50
Half-	space	622.2	0.131	3153	7884	0.473	3.05

## Table 3-3A Subgrade Properties 270-500 Generic Profile - Continued

Layer	Thickness	Depth	Unit Weight	Vs	Vp	Poisson	Damp.
#	[ft]	[ft]	kcf	ft/sec	ft/sec	Nalio	%
1	4.29	0.0	0.125	1302	5644	0.472	3.03
2	4.29	4.3	0.125	1302	5644	0.472	3.03
3	4.29	8.6	0.125	1334	5800	0.472	3.13
4	4.29	12.9	0.125	1334	5800	0.472	3.13
5	4.29	17.2	0.125	1334	5800	0.472	3.13
6	4.29	21.5	0.125	1303	5710	0.473	3.34
7	4.29	25.7	0.125	1303	5710	0.473	3.34
8	4.29	30.0	0.125	1335	5871	0.473	3.39
9	4.29	34.3	0.125	1335	5871	0.473	3.39
10	4.29	38.6	0.125	1372	6038	0.473	3.41
11	4.69	42.9	0.125	1362	6030	0.473	2.62
12	4.69	47.6	0.125	1362	6030	0.473	2.62
13	4.69	52.3	0.125	1417	6265	0.473	2.58
14	4.69	57.0	0.125	1417	6265	0.473	2.58
15	4.69	61.7	0.125	1450	6405	0.473	2.60
16	4.69	66.4	0.125	1450	6405	0.473	2.60
17	4.69	71.0	0.125	1456	6452	0.473	2.65
18	4.69	75.7	0.125	1456	6452	0.473	2.65
19	4.69	80.4	0.125	1435	6391	0.473	2.77
20	4.69	85.1	0.125	1435	6391	0.473	2.77
21	4.69	89.8	0.125	1416	6325	0.474	2.87
22	4.69	94.5	0.125	1416	6325	0.474	2.87
23	5.00	99.2	0.131	1483	6571	0.473	2.73
24	5.00	104.2	0.131	1483	6571	0.473	2.73
25	5.00	109.2	0.131	1494	6636	0.473	2.76
26	5.00	114.2	0.131	1494	6636	0.473	2.76
27	5.00	119.2	0.131	1534	6804	0.473	2.74
28	5.00	124.2	0.131	1534	6804	0.473	2.74
29	5.00	129.2	0.131	1542	6855	0.473	2.78
30	5.00	134.2	0.131	1542	6855	0.473	2.78
31	5.00	139.2	0.131	1599	7090	0.473	2.72
32	5.00	144.2	0.131	1599	7090	0.473	2.72
33	5.00	149.2	0.131	1544	6888	0.474	2.86
34	5.00	154.2	0.131	1544	6888	0.474	2.86
35-71	12.50	159.2	0.134	3317	7812	0.390	0.50
Half	-space	621.7	0.134	3317	7812	0.390	0.50

 Table 3-3B Subgrade Properties 270-200 Generic Profile

Layer	Thickness	Depth	Unit Weight	Vs	Vp	Poisson	Damp.
#	[ft]	[ft]	kcf	ft/sec	ft/sec	Nalio	%
1	5.00	0.0	0.131	1698	5254	0.442	6.86
2	5.00	5.0	0.131	1698	5254	0.442	6.86
3	6.00	10.0	0.131	1857	5046	0.422	6.59
4	6.00	16.0	0.131	1857	5046	0.422	6.59
5	6.00	22.0	0.131	1857	5046	0.422	6.59
6	7.25	28.0	0.131	1980	5277	0.418	6.75
7	7.25	35.3	0.131	1980	5277	0.418	6.75
8	7.25	42.5	0.131	2039	5408	0.417	6.88
9	7.25	49.8	0.131	2039	5408	0.417	6.88
10	6.00	57.0	0.131	2111	5620	0.418	6.98
11	7.00	63.0	0.131	2111	5620	0.418	6.98
12	7.00	70.0	0.131	2111	5620	0.418	6.98
13	6.00	77.0	0.131	2157	5720	0.417	6.15
14	7.00	83.0	0.131	2157	5720	0.417	6.15
15	7.00	90.0	0.131	2157	5720	0.417	6.15
16	7.50	97.0	0.131	2314	6121	0.417	6.11
17	7.50	104.5	0.131	2314	6121	0.417	6.11
18	7.70	112.0	0.131	2314	6121	0.417	6.11
19	7.50	119.7	0.131	2336	6219	0.418	6.22
20	7.50	127.2	0.131	2336	6219	0.418	6.22
21	7.60	134.7	0.131	2336	6219	0.418	6.22
22	7.50	142.3	0.131	2373	6359	0.419	6.36
23	7.50	149.8	0.131	2373	6359	0.419	6.36
24	7.70	157.3	0.131	2373	6359	0.419	6.36
25	7.00	165.0	0.131	2455	6580	0.419	6.35
26	7.00	172.0	0.131	2455	6580	0.419	6.35
27	7.00	179.0	0.131	2455	6580	0.419	6.35
28	7.00	186.0	0.131	2452	6612	0.420	6.46
29	7.00	193.0	0.131	2452	6612	0.420	6.46
30	7.00	200.0	0.131	2452	6612	0.420	6.46
31	6.25	207.0	0.131	2647	6733	0.409	5.82
32	6.25	213.3	0.131	2647	6733	0.409	5.82
33	6.25	219.5	0.131	2592	6620	0.410	5.93
34	6.25	225.8	0.131	2592	6620	0.410	5.93
35	6.25	232.0	0.131	2719	6915	0.409	5.81
36	6.25	238.3	0.131	2719	6915	0.409	5.81
37	12.50	244.5	0.131	2842	7195	0.408	5.70
38	12.50	257.0	0.131	2836	7187	0.408	5.76
39	12.50	269.5	0.131	2820	7167	0.408	5.83

 Table 3-3C Subgrade Properties 560-500 Generic Profile

Layer	Thickness	Depth	Unit Weight	Vs	Vp	Poisson	Damp.
#	[ft]	[ft]	kcf	ft/sec	ft/sec	Ratio	%
40	12.50	282.0	0.131	2844	7229	0.408	5.83
41	12.50	294.5	0.131	2840	7233	0.409	5.89
42	12.50	307.0	0.131	2765	7078	0.410	6.02
43	12.50	319.5	0.131	2739	7027	0.410	6.10
44	12.50	332.0	0.131	2785	7139	0.410	6.07
45	12.50	344.5	0.131	2839	7267	0.410	6.03
46	12.50	357.0	0.131	2768	7117	0.411	6.15
47	12.50	369.5	0.131	2788	7177	0.411	6.17
48	12.50	382.0	0.131	2775	7154	0.411	6.22
49	12.50	394.5	0.131	2758	7126	0.412	6.26
50	6.25	407.0	0.131	2695	6994	0.413	6.38
51	6.25	413.3	0.131	2695	6994	0.413	6.38
52	6.25	419.5	0.131	2675	6963	0.413	6.44
53	6.25	425.8	0.131	2675	6963	0.413	6.44
54	6.50	432.0	0.131	2642	6898	0.414	6.52
55	6.60	438.5	0.131	2642	6898	0.414	6.52
56	7.40	445.1	0.131	2620	6860	0.415	6.57
57	7.50	452.5	0.131	2620	6860	0.415	6.57
58-68	14.00	460.0	0.134	3314	7804	0.390	0.50
Half-	space	614.0	0.134	3314	7804	0.390	0.50

## Table 3-3C Subgrade Properties 560-500 Generic Profile - Continued

Layer	Thickness	Depth	Unit Weight	Vs	Vp	Poisson	Damp.
#	[ft]	[ft]	kcf	ft/sec	ft/sec	Natio	%
1	5.00	0.0	0.131	1552	5161	0.450	7.82
2	5.00	5.0	0.131	1552	5161	0.450	7.82
3	6.00	10.0	0.131	1624	4772	0.435	7.88
4	6.00	16.0	0.131	1624	4772	0.435	7.88
5	6.00	22.0	0.131	1624	4772	0.435	7.88
6	7.25	28.0	0.131	1788	4981	0.426	7.76
7	7.25	35.3	0.131	1788	4981	0.426	7.76
8	7.25	42.5	0.131	1801	5040	0.427	8.03
9	7.25	49.8	0.131	1801	5040	0.427	8.03
10	6.00	57.0	0.131	1937	5378	0.425	7.91
11	7.00	63.0	0.131	1937	5378	0.425	7.91
12	7.00	70.0	0.131	1937	5378	0.425	7.91
13	6.00	77.0	0.131	2018	5603	0.425	6.86
14	7.00	83.0	0.131	2018	5603	0.425	6.86
15	7.00	90.0	0.131	2018	5603	0.425	6.86
16	7.50	97.0	0.131	2158	5852	0.421	6.80
17	7.50	104.5	0.131	2158	5852	0.421	6.80
18	7.70	112.0	0.131	2158	5852	0.421	6.80
19	7.50	119.7	0.131	2188	5898	0.420	6.95
20	7.50	127.2	0.131	2188	5898	0.420	6.95
21	7.70	134.7	0.131	2188	5898	0.420	6.95
22	6.00	142.4	0.131	2144	5741	0.419	7.18
23	6.00	148.4	0.131	2144	5741	0.419	7.18
24	5.60	154.4	0.131	2144	5741	0.419	7.18
25-60	12.50	160.0	0.134	3393	7337	0.364	0.50
Half	-space	610.0	0.134	3393	7337	0.364	0.50

 Table 3-3D Subgrade Properties 560-200 Generic Profile

Layer	Thickness	Depth	Unit Weight	Vs	Vp	Poisson Ratio	Damp.
#	[ft]	[ft]	kcf	ft/sec	ft/sec	Natio	%
1	4.29	0.0	0.125	1282	5534	0.472	2.87
2	4.29	4.3	0.125	1282	5534	0.472	2.87
3	4.29	8.6	0.125	1291	5607	0.472	3.01
4	4.29	12.9	0.125	1291	5607	0.472	3.01
5	4.29	17.2	0.125	1291	5607	0.472	3.01
6	4.29	21.5	0.125	1306	5682	0.472	3.12
7	4.29	25.7	0.125	1306	5682	0.472	3.12
8	4.29	30.0	0.125	1283	5624	0.473	3.29
9	4.29	34.3	0.125	1283	5624	0.473	3.29
10	4.29	38.6	0.125	1300	5716	0.473	3.35
11	4.69	42.9	0.125	1303	5748	0.473	2.57
12	4.69	47.6	0.125	1303	5748	0.473	2.57
13	3.74	52.3	0.125	1333	5873	0.473	2.58
14	3.74	56.0	0.125	1333	5873	0.473	2.58
15-62	12.50	59.8	0.134	3109	7322	0.390	0.50
Half	-space	72.3	0.134	3109	7322	0.390	0.50

Table 3-3E Subgrade Properties 560-100 Generic Profile

Layer	Thicknes s	Depth	Unit Weight	Vs	Vp	Poisson Ratio	Damp.
#	[ft]	[ft]	kcf	ft/sec	ft/sec	Natio	%
1	6.50	0.0	0.134	3237	8188	0.407	3.75
2	6.50	6.5	0.134	3237	8188	0.407	3.75
3	10.00	13.0	0.134	4021	9755	0.398	3.61
4	10.00	23.0	0.134	4021	9755	0.398	3.61
5	11.50	33.0	0.140	4653	10725	0.384	3.59
6	11.50	44.5	0.140	4653	10725	0.384	3.59
7	12.50	56.0	0.140	4793	10559	0.370	3.59
8	12.50	68.5	0.140	4793	10559	0.370	3.59
9	17.00	81.0	0.140	5330	11237	0.355	3.56
10	17.00	98.0	0.140	5330	11237	0.355	3.56
11	21.50	115.0	0.140	5872	11956	0.341	3.49
12	21.50	136.5	0.140	5872	11956	0.341	3.49
13	2.00	158.0	0.140	5918	11871	0.335	3.52
14-32	25.00	160.0	0.157	9264	18165	0.324	0.50
Half-	space	635.0	0.157	9264	18165	0.324	0.50

 Table 3-3F Subgrade Properties 900-200 Generic Profile

Table 3-3G Subgrade Properties 900-100 Generic Profile

Layer	Thicknes s	Depth	Unit Weight	Vs	Vp	Poisson Batio	Damp.
#	[ft]	[ft]	kcf	ft/sec	ft/sec	Natio	%
1	13.00	0.0	0.134	3403	8480	0.404	3.60
2	10.00	13.0	0.134	4016	9689	0.396	3.51
3	10.00	23.0	0.134	4016	9689	0.396	3.51
4	11.50	33.0	0.140	4731	10840	0.382	3.46
5	11.50	44.5	0.140	4731	10840	0.382	3.46
6	4.00	56.0	0.140	4930	10793	0.368	3.44
7-30	25.00	60.0	0.157	8936	17520	0.324	0.50
Half-	space	660.0	0.157	8936	17520	0.324	0.50

Table 3-3H Subgrade Properties 2032-100 Generic Profile

Layer	Thickness	Depth	Unit Weight	Vs	Vp	Poisson Ratio	Damp.
#	[ft]	[ft]	kcf	ft/sec	ft/sec	Ratio	%
1	10.00	0.0	0.140	7126	12343	0.250	3.16
2	16.67	10.0	0.140	7333	12701	0.250	3.16
3	16.67	26.7	0.140	7746	13417	0.250	3.16
4	16.66	43.3	0.140	8128	14077	0.250	3.16
5-24	30.00	60.0	0.157	8599	16794	0.322	0.50
Half	-space	660.0	0.157	8599	16794	0.322	0.50

Mesh Si		Size (ft)	Maximu	m Freque	ncy (Hz)	Frequencies of Analyses			
Analysis	D/D		FE N	FE Mesh		Total No.		Cut off Freq. (Hz)	
	R/D	F3/D	R/B	PS/B	Layers	R/B	PS/B	R/B	PS/B
270-500			24.8	39.4	34.2	79	67	30.9	33
270-200			26.0	41.3	53.1	77	67	29.1	33
560-500	10		34.0	53.9	43.8	74	67	30.9	33
560-200			31.0	49.3	49.3	77	67	35.0	33
560-100		6.3	25.6	40.7	49.7	78	67	35.0	33
900-200			64.7	102.7	54.6	65	85	27.3	50
900-100	14		68.1	108.0	52.3	65	85	27.3	50
2032-100			142.5	226.2	57.3	83	85	49.8	50

 Table 3-4 Maximum Frequency of Analysis

### Table 3-5 Weight of the R/B Complex

Structure	Weight (kips)
PCCV Above Ground Elevation	74,347
CIS Above Ground Elevation	85,738
RCL System	9,553
R/B Above Ground Elevation	277,730
PCCV at Ground Elevation	3,941
R/B at Ground Elevation	116,019
CIS at Ground Elevation	21,801
Basement	187,000
Total Weight of R/B Complex	776,129
Equivalent Uniform Bearing Pres	sure = 11.96 ksf

Location	Weight (kips)		
Roof Level	7,940		
Ground Floor Level	12,410		
Basemat Level	16,400		
Total	36,750		
Equivalent Uniform Bearing Pressure = 4.62 ksf			

## Table 3-6 Weight of the PS/B

Table 3-7 R/B Con	plex and PS/B In	put Material Properties
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Structural Component	Concrete Compressive Strength (psi)	Young's Modulus (x10⁵ ksf)	Poisson's Ratio	Damping SSE
PCCV	7,000	6.870	0.17	5%
R/B including FH/A, and Basement	4,000	5.191*	0.17	7%
CIS	4,000	5.191**	0.17	5%
PS/B	4,000	5.191*	0.17	7%

\* nominal concrete stiffness of cracked members reduced 50% \*\* nominal concrete stiffness reduced 25% to consider cracking
Chruchture	Mada	Frequency (Hz)				
Structure	wode	NS	EW	Vertical		
	1	4.5	4.5	12.2		
PCCV	2	12.8	12.8	16.0		
	3	26.2	26.2	17.3		
	1	5.0	5.3	14.4		
CIS	2	7.5	7.6	18.1		
	3	10.0	10.0	18.7		
	1	5.6	6.0	11.3		
R/B &	2	7.5	7.3	11.9		
FH/A	3	9.3	9.0	17.5		
	1	8.7	10.3	13.9		
	2	12.8	12.3	16.9		
PS/B	3	19.9	20.6	26.0		
	4	20.2	22.3	33.5		
	5	21.4	23.5	36.8		

Table 3-8 Fixed Base Modal Properties of R/B Complex and PS/B

ISBS Sumbol	Direction	Location	Envelope of	
isks Symbol	Direction	Description	Elev.	ARS at Node
CV11OR_(x,y,z)	x y z	Top of Dome	230'-2"	CV11
CV10OR_(x,y,z)	x y z	7ft under Dome Top	225'-0"	CV10
CV09OR_(x,y,z)	x y z	Dome El. at 40 deg.	201'-8"	CV09
CV08OR_(x,y,z)	x y z	Dome El. at 15 deg.	173'-1"	CV08
CV07OR_(x,y,z)	x y z	Top of Polar Crane Rail	145'-7"	CV07
CV06OR_(x,y,z)	x y z	Roof of MS/FW Room	115'-6"	CV06
CV05OR_(x,y,z)	x y z	MS Penetration	92'-2"	CV05
CV04OR_(x,y,z)	x y z	Operation Floor Level	76'-5"	CV04
CV03OR_(x,y,z)	x y z	FW Penetration	68'-3"	CV03
CV02OR_(x,y,z)	x y z	R/B 3 <sup>rd</sup> floor level	50'-2"	CV02
CV01OR_(x,y,z)	x y z	R/B 2 <sup>nd</sup> floor level	25'-3"	CV01
CV00OR_(x,y,z)	x y z	PCCV Ground El	1'-11"	CV00

Table 3-9 ISRS	for Prestressed	Concrete	Containment	Vessel	(PCCV)
	101 1 1000 00000	001101010	oontanniont	100001	(! 001)

ISPS Symbol	Direction	Location	Envolope of APS at Nodes						
	Direction	Description	Elev.		LIIVen	spe or a	ARO al	noues	
ICSGOR_(x,y,z)	x y z	Top of SG wall	112'-0"	IC61	W51	IC62	W52	IC71	IC72
ICP3OR_(x,y,z)	x y z	Upper Pressurizer	139'-6"	IC09	W7	S5			
ICP2OR_(x,y,z)	x y z	Middle Pressurizer	112'-4"	IC08 IC18 W6		W6			
ICP1OR_(x,y,z)	x y z	Lower Pressurizer	76'-5"	IC07 S3					
IC05OR_(x,y,z)	x y z	Operation floor	76'-5"	IC05	IC05 W3		S4		
IC15OR_(x,y,z)	x y z	SG Support	59'-2"	IC15					
IC04OR_(x,y,z)	x y z	SG Support	50'-2"	IC04	W2	S1	S2	IC14	
IC03OR_(x,y,z)	x y z	RV Support	35'-9"	IC03					
IC02OR_(x,y,z)	x y z	R/B 2 <sup>nd</sup> Floor Level	25'-3"	IC02	IC02 W1 S7		S8		
IC01OR_(x,y,z)	x y z	Pressure Header Room	16'-0"	IC01					
IC00OR_(x,y,z)	x y z	CIS Ground Level	1'-11"	IC00					

Table 3-10 ISRS for Containment Internal Structure (CIS)

ISRS	Dir		Locatio	on	Envolope of ABS at Nodes				
Symbol	Dir.	Description	N-S CL	EW CL	Elev.	Elive	iope of A	KS at NU	ues
FH08OR	XYZ	FH/A Roof	AR-CR	3R-11R	154'-8"	FH08 5FN1	NE08 5FN2	NW08 5FE1	RFS1 5FE2
FH07OR	XYZ	Top of FH/A crane rail	AR-CR	3R-11R	125'-4"	FH07	NE07	NW07	
FH06OR	ХҮZ	Center Building Roof	AR-CR	3R-11R	101'-0"	FH06	NE06	NW06	
						RE05	SW05	SE05	RFS2
RE05OR	XYZ	MS/FW Room	HR-LR	1R-11R	115'-6"	RFS3	RFS4	RFS5	4FN3
		RUUI				4FE1	4FE2		
RE42OR	XYZ	R/B 5 <sup>th</sup> Floor East Roof	CR-HR	5R-11R	101'-0"	RE42	RFS7	4FN2	
RE410R	XYZ	R/B 5 <sup>th</sup> Floor West Roof	AR-LR	1R-5R	101'-0"	RE41	RFS6	4FN1	NW04
RE04OR	XYZ	R/B 5 <sup>th</sup> Floor MS/FW Room	GR-LR	5R-11R	101'-0"	RE04	SW04	SE04	
	X V 7	R/B Operation		1R_11R	76'-5"	RE03	SW03	SE03	NE03
ILUJON	X12	Floor		112-1112	70-5	NW03			
		rd				RE02	SW02	SE02	NE02
RE02OR	XYZ	R/B 3 <sup>14</sup> Floor	AR-LR	1R-11R	50'-2"	NW02	3FS1	3FS2	3FS3
						3FS4	3FS5		
RE01OR	XYZ	R/B 2 <sup>nd</sup> Floor	AR-LR	1R-11R	25'-3"	RE01	SW01	SE01	NE01
						NVV01	2FS1	0500	
RE00OR	XYZ	R/B Ground Floor	AR-LR	1R-11R	3'-7"	NW00	5000	SEUU	NEUU
BS01OR	XYZ	R/B Basement	AR-LR	1R-11R	-8'-7"	BS01 NWB1	SWB1	SEB1	NEB1

# Table 3-11 ISRS for Reactor Building (R/B) and Fuel Handling Area (FH/A) RigidWalls/Slabs

ISRS Symbol	Dir.	Description	Elev.	Envelope of ARS at Nodes			
FH08Z1	Z	FH/A Roof, Slab Zone 1	154'-8"	115_10a 115_10e	115_10b	115_10c	115_10d
RE05Z1	Z	MS/FW Room Roof, Slab Zone 1	115'-6"	115_31 115_40	115_32 115_33a	115_33c 115_33b	115_33d
RE05Z2	Z	MS/FW Room Roof, Slab Zone 2	115'-6"	115_30a	115_30b	115_30c	115_30
RE42Z1	Z	R/B 5 <sup>th</sup> Floor East Roof, Slab Zone 1	101'-0"	101_22 101_23	101_23a	101_24a	101_21
RE41Z1	Z	R/B 5 <sup>th</sup> Floor West Roof, Slab Zone 1	101'-0"	101_10a	101_10b		
RE41Z2	Z	R/B 5 <sup>th</sup> Floor West Roof, Slab Zone 2	101'-0"	101_12b	101_41b	101_43a	
RE41Z3	Z	R/B 5 <sup>th</sup> Floor West Roof, Slab Zone 3	101'-0"	101_11	101_40	101_41a	
RE04Z1	Z	R/B 5 <sup>th</sup> Floor MS/FW Room, Slab Zone 1	101'-0"	101_30a	101_33a	101_30	
RE03Z1	Z	R/B Operation Floor, Slab Zone 1	76'-5"	86_17b	76_33b	76_43b	
RE03Z2	Z	R/B Operation Floor, Slab Zone 2	76'-5"	86_14 76_43a	76_10b	76_13	76_21g
RE03Z3	Z	R/B Operation Floor, Slab Zone 3	76'-5"	86_16	76_10c	76_11a	76_20a
RE03Z4	Z	R/B Operation Floor, Slab Zone 4	76'-5"	76_33a 76_31b	76_10a 76_30a	76_40a 76_30b	76_41c 76_30c
RE02Z1	Z	R/B 3 <sup>rd</sup> Floor, Slab Zone 1	50'-2"	50_21b	50_21c	50_21d	50_21e
RE02Z2	Z	R/B 3 <sup>rd</sup> Floor, Slab Zone 2	50'-2"	50_20b	50_22a	50_33d	50_43d
RE02Z3	Z	R/B 3 <sup>rd</sup> Floor, Slab Zone 3	50'-2"	50_30a	50_30b	50_40b	
DE0274	7	P/B 3 <sup>rd</sup> Floor Slab Zone 4	50' 2"	50_10b	50_32c	50_34	50_44
REUZZ4	2	NB 3 FI001, Slab 2011e 4	50-2	50_42e	35_26		
RE01Z1	Z	R/B 2 <sup>nd</sup> Floor, Slab Zone 1	25'-3"	25_30b	25_33b	25_42d	
RE01Z2	Z	R/B 2 <sup>nd</sup> Floor, Slab Zone 2	25'-3"	25_33d	25_34b	25_43d	25_44b
RE01Z3	Z	R/B 2 <sup>nd</sup> Floor, Slab Zone 3	25'-3"	25_20b	25_20d	25_20e	25_20f

Table 3-12 ISRS for Reactor Building (R/B) and Fuel Handling Area (FH/A) Flexit	ble
Walls/Slabs	

Mitsubishi Heavy Industries, LTD.

ISRS Symbol	Dir.	Description	Elev.	Envelope of ARS		RS at Nod	es
RE01Z4	Z	R/B 2 <sup>nd</sup> Floor, Slab Zone 4	25'-3"	25_20a	13_31	13_42	
RE01Z5	Z	R/B 2 <sup>nd</sup> Floor, Slab Zone 1	25'-3"	25_20c	25_22e	25_23	13_17
RE00Z1	Z	R/B Ground Floor, Slab Zone 1	3'-7"	3_32a	3_32d		
RE00Z2	Z	R/B Ground Floor, Slab Zone 2	3'-7"	3_32b	3_32c		
RE00Z3	Z	R/B Ground Floor, Slab Zone 3	3'-7"	3_10a 3 15	3_20a	3_15c	3_15d
BS01Z1	Z	R/B Basement, Slab Zone 1	-8'-7"	 	n8_11c	n8_16	
D00470	7	D/D Decement Cleb Zere 2	0' 7"	 	 n8_14b		n8_22a
B20122		R/B Basement, Slad Zone Z	-8-7	n8_30a	n8_40a		
FH07X1	Х	Top Of FH/A Crane Rail, Walls Running E-W	125'-4"	W_N_1a	W_N_1b	W_N_1c	W_N_1d
RF04X1	x	R/B 5 <sup>th</sup> Floor MS/FW Room,	101'-0"	W_S_3	W_S_4	W_S_5	W_S_6
	~	Walls Running E-W		W_P1n	W_P2n		
RE03X1	х	R/B Operation Floor, Walls Running E-W	76'-5"	W_S_9	W_S_10		
RE02X1	х	R/B 3 <sup>rd</sup> Floor, Walls Running E-W	50'-2"	W_N_3	W_N_2		
RE00X1	х	R/B Ground Floor, Walls Running E-W	3'-7"	W_S_21	W_S_22	W_S_25	W_S_26
FH07Y1	Y	Top Of FH/A Crane Rail, Walls Running N-S	125'-4"	W_E_1			
RE42Y1	Y	R/B 5 <sup>th</sup> Floor East Roof, Walls Running N-S	101'-0"	W_E_2	W_E_3		
RE41Y1	Y	R/B 5 <sup>th</sup> Floor West Roof, Walls Running N-S	101'-0"	W_W_2			
RE04Y1	Y	R/B 5 <sup>th</sup> Floor MS/FW Room, Walls Running N-S	101'-0"	W_E_7 W_P2e	W_W_1 W_P2w	W_P1e	W_P1w
RE03Y1	Y	R/B Operation Floor, Walls	76'-5"	W_E_4a	W_E_4b	W_E_5	W_W_5
		Running N-3		W6			
RE02Y1	Y	Running N-S	50'-2"	W_W_8	W_E_6	W_P3e	
RE00Y1	Y	R/B Ground Floor, Walls Running N-S	3'-7"	W_E_8			

# Table 3-12 ISRS for Reactor Building (R/B) and Fuel Handling Area (FH/A) Flexible Wall/Slab -Continued

Note: See Appendix B for locations of flexible slabs and walls.

ISRS Symbol	Dir.	Elev.	Description	ARS at Nodes (provide node numbers and x and y coordinates)				
Basemat	XYZ	-26'-4"	Envelope	BM01	BM02	BM03	BM04	BM05
				GS01	GS02	GS03	GS04	GS05
Ground Floor	XY	3'-7"	Envelope	GS06	GS07	GS08	GS09	GS10
				GS11	GS12	GS13		
Roof	XYZ	39'-0"	Envelope	RF01	RF02	RF03	RF04	RF05
GTG B	Z	3'-7"	Average	GS03	GS04			
GTG C	Z	3'-7"	Average	GS05	GS06			
GTG D	Z	3'-7"	Average	GS08	GS09			
GTG C&D Panels	Z	3'-7"	Average	GS10	GS11			

Table 3-13 ISRS for Power Source Building (PS/B)

	Locat	ion	Maximum Displacements (in)			
Node	x (ft)	y (ft)	z (ft)	d <sub>NS</sub>	d <sub>EW</sub>	dv
CV11	0.00	0.00	230.17	1.667	2.104	0.244
CV10	0.00	0.00	225.00	1.649	2.076	0.240
CV09	0.00	0.00	201.67	1.561	1.945	0.234
CV08	0.00	0.00	173.08	1.447	1.776	0.230
CV07	0.00	0.00	145.58	1.333	1.608	0.228
CV06	0.00	0.00	115.50	1.204	1.416	0.226
CV05	0.00	0.00	92.17	1.103	1.267	0.223
CV04	0.00	0.00	76.42	1.034	1.165	0.221
CV03	0.00	0.00	68.25	0.998	1.114	0.220
CV02	0.00	0.00	50.17	0.922	1.000	0.217
CV01	0.00	0.00	25.25	0.821	0.847	0.214
CV00	0.00	0.00	1.92	0.732	0.738	0.210

Table 4-1 Maximum Displacements of PCCV Relative to Free Field

	Locat	ion		Maximum Displacements (in)			
Node	x (ft)	y (ft)	z (ft)	d <sub>NS</sub>	d <sub>ew</sub>	dv	
IC09	39.29	0.00	139.50	1.415	1.565	0.245	
IC18	39.24	0.00	110.75	1.208	1.362	0.245	
IC08	39.29	0.00	112.33	1.220	1.374	0.245	
IC05	3.36	0.74	76.42	0.964	1.118	0.215	
IC72	7.29	44.03	112.00	1.090	1.336	0.319	
IC71	8.11	-43.98	112.00	1.087	1.333	0.318	
IC62	3.88	37.65	96.58	1.034	1.243	0.292	
IC61	3.94	-37.73	96.58	1.033	1.242	0.292	
IC15	3.36	0.74	59.17	0.905	1.019	0.214	
IC04	1.92	-0.61	50.17	0.876	0.966	0.212	
IC14	1.92	-0.61	45.67	0.859	0.938	0.212	
IC03	-2.28	0.13	35.88	0.826	0.881	0.212	
IC02	-2.38	-0.18	25.25	0.791	0.824	0.212	
IC01	1.22	0.05	16.00	0.766	0.782	0.210	
IC00	1.22	0.05	1.92	0.732	0.738	0.209	

## Table 4-2 Maximum Displacements of CIS Relative to Free Field

Maximum Displacements (in) Location Node x (ft) y (ft) z (ft) dv d<sub>NS</sub> d<sub>EW</sub> 17.44 154.50 1.351 1.500 0.448 FH08 -116.67 -146.58 106.67 154.50 **NE08** 1.351 1.502 0.767 NW08 -146.58 -71.42 154.50 1.352 1.502 0.653 FH07 -120.08 18.37 125.67 1.216 1.357 0.457 115.42 115.50 1.092 0.406 **RE05** 6.17 1.279 FH06 -120.81 17.41 101.00 1.091 1.228 0.456 101.00 1.044 0.449 RE41 -28.46 -77.07 1.219 101.00 3.48 79.00 1.043 1.214 0.448 RE42 **RE04** 119.54 -7.83 101.00 1.048 1.210 0.416 9.95 2.01 76.42 1.090 0.220 **RE03** 0.968 **NE03** -146.58 106.67 76.42 0.968 1.093 0.738 NW03 -146.58 -106.67 76.42 0.970 1.093 0.734 **SE03** 161.67 106.67 76.42 0.968 1.086 0.748 SW03 161.67 -106.67 76.42 0.970 1.086 0.744 **RE02** -5.50 -2.93 50.17 0.886 0.962 0.217 0.215 **RE01** -5.34 -4.09 25.25 0.805 0.839 **RE00** 1.24 -0.25 3.58 0.736 0.742 0.209

#### Table 4-3 Maximum Displacements of R/B and FH/A Relative to Free Field

Location		Maximum Displacements (in)				
Location	Elevation	d <sub>NS</sub>	d <sub>EW</sub>	d <sub>v</sub>		
North West Corner	Roof	0.37	0.23	0.12		
South East Corner	Roof	0.37	0.23	0.13		
South West Corner	Roof	0.39	0.24	0.13		
North East Corner	Roof	0.41	0.25	0.13		
North West Corner	Ground Floor	0.23	0.16	0.12		
South East Corner	Ground Floor	0.23	0.17	0.12		
South West Corner	Ground Floor	0.23	0.16	0.12		
North East Corner	Ground Floor	0.23	0.16	0.12		
North West Corner	Basemat Top	0.13	0.11	0.11		
South East Corner	Basemat Top	0.13	0.11	0.11		
South West Corner	Basemat Top	0.13	0.11	0.11		
North East Corner	Basemat Top	0.12	0.11	0.10		

## Table 4-4 Maximum Displacements of PS/B Relative to Free Field

	Quasi-Static Location Acceleration Load (g			ic bad (g)	
	Node	Elev. (ft)	A <sub>NS</sub>	A <sub>EW</sub>	Av
	CV11	230.17	1.80	2.40	2.15
Domo	CV10	225.00	1.80	2.40	1.60
Dome	CV09	201.67	1.70	2.20	1.30
	CV08	173.08	1.55	1.95	1.05
	CV07	145.58	1.40	1.65	0.95
	CV06	115.50	1.15	1.35	0.80
	CV05	92.17	1.00	1.10	0.70
Cylinder Wall	CV04	76.42	0.90	0.95	0.70
	CV03	68.25	0.85	0.90	1.20
	CV02	50.17	0.70	0.70	0.55
	CV01	25.25	0.55	0.50	0.50
Base	CV00	1.92	0.50	0.50	0.50

 Table 4-5 SSE Design Loads on PCCV

	Location		Quasi-Static Acceleration Load (g		ic bad (g)
	Node	Elev. (ft)	A <sub>NS</sub>	A <sub>EW</sub>	Av
Drocourining	IC09	139.50	4.00	2.95	1.90
Chamber	IC18	110.75	2.00	1.95	1.70
vvan	IC08	112.33	1.90	1.90	1.60
Below Level of Operating Floor	IC05	76.42	0.80	1.10	0.70
	IC72	112.00	2.45	2.20	1.45
SG Wall	IC71	112.00	2.40	2.10	1.45
	IC62	96.58	1.95	1.95	1.30
	IC61	96.58	1.50	1.45	1.00
	IC15	59.17	5.75	1.20	0.60
	IC04	50.17	0.55	0.55	0.55
Below Level	IC14	45.67	3.55	3.10	0.50
Floor	IC03	35.88	0.75	0.80	0.65
	IC02	25.25	0.60	0.60	0.65
	IC01	16.00	0.55	0.55	0.50
Base	IC00	1.92	0.50	0.50	0.50

 Table 4-6 SSE Design Loads on CIS

	Loca	ation	Quasi-Static Acceleratior Load (g)		
	Node	Elev. (ft)	A <sub>NS</sub>	A <sub>EW</sub>	Av
	FH08	154.5	2.45	1.55	1.45
FH/A	FH07	125.67	1.90	1.30	1.45
	FH06	101	2.10	2.45	2.40
	RE05	115.5	0.85	1.00	0.95
	RE41	101	1.60	1.10	1.05
	RE42	101	1.30	0.75	0.85
R/B	RE04	101	0.60	1.00	0.90
	RE03	76.42	0.75	0.75	0.65
	RE02	50.17	0.55	0.60	0.55
	RE01	25.25	0.55	0.55	0.50
Base	RE00	3.58	0.50	0.50	0.50

Table 4-7 SSE Design Loads on R/B and FH/A

Slab Group ID*	Seismic Quasi-Static Load (g)
FH08Z1	3.70
RE05Z2	4.25
RE05Z1	3.00
RE41Z1	3.25
RE41Z3	3.50
RE41Z2	2.50
RE42Z1	3.50
RE04Z1	2.50
RE03Z1	2.00
RE03Z2	2.00
RE03Z3	2.00
RE03Z4	1.50
RE02Z1	2.00
RE02Z2	1.50
RE02Z3	1.50
RE02Z4	1.25
RE01Z1	1.50
RE01Z2	1.25
RE01Z3	1.50
RE01Z4	1.75
RE01Z5	1.00
RE00Z1	1.25
RE00Z2	1.00
RE00Z3	1.00
BS01Z1	1.00
BS01Z2	1.00

Table 4-8 Out-of-Plane SSE Loads on R/B-FH/A Flexible Slabs

Note \*: See Appendix B for locations of flexible slabs

Wall Group ID*	Seismic Quasi-Static Load (g)			
Walls Spanning in EW Direction				
FH07x1	2.25			
RE04x1	1.50			
RE03x1	1.00			
RE02x1	1.00			
RE00x1	1.00			
Walls Spanning in NS Direction				
FH07Y1	2.50			
RE42Y1	3.50			
RE41Y1	3.00			
RE04Y1	1.20			
RE03Y1	1.20			
RE02Y1	1.00			
RE00Y1	0.75			

### Table 4-9 Out-of-Plane SSE Loads on R/B-FH/A Walls

Note \*: See Appendix B for locations of flexible walls

Elevation	Seismic Quasi-Static Load (g)				
(π)	A <sub>NS</sub>	A <sub>EW</sub>	Av		
49.20	1.30	1.60	1.48		
44.04	1.25	1.49	1.41		
38.88	1.19	1.40	1.49		
31.21	1.17	1.15	1.01		
23.54	1.13	1.07	1.16		
16.44	1.04	1.01	0.92		
9.35	0.84	0.81	0.90		
2.25	0.84	0.69	0.90		
-5.33	0.84	0.69	0.68		
-10.17	0.82	0.71	0.58		
-15.00	0.66	0.62	0.66		
-20.67	0.61	0.53	0.49		
-26.33	0.52	0.49	0.47		
-31.29	0.52	0.49	0.47		
-36.25	0.51	0.49	0.46		

## Table 4-10 SSE Design Loads on PS/B

Wall/Slab	Location	Seismic Quasi-Static Load (g)		
		A <sub>NS</sub>	A <sub>EW</sub>	Av
Ground Slab	Between Cl. 4P and 5P			0.88
Ground Slab	Between CI. 1P and 4P			0.94
Roof Slab	El. 39'-6"			1.49
Wall at	Above Ground		1.69	
CL 1P	Below Ground		0.64	
Wall at	Above Ground		1.16	
CL 2P	Below Ground		0.63	
Wall at	Above Ground		1.09	
CL 5P	Below Ground		0.86	
Wall at CL 3P	Below Ground		0.87	
Wall at CL 4P	Below Ground		0.74	
Wall at CL AP	Above Ground	1.14		
	Below Ground	0.93		
Wall at	Above Ground	1.14		
CL CP	Below Ground	0.75		
Wall at CL BP	Above Ground	0.96		

	Table 4-11	Out-of-Plane	SSE Loads	on PS/B	Slabs	and Walls
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Elevation (ft)	Depth (ft)	Total Pressure (ksf)
2.58	0.00	2.00
-0.53	3.11	2.29
-5.19	7.77	2.49
-8.29	10.87	2.54
-12.95	15.53	2.58
-16.06	18.64	2.54
-20.72	23.30	2.45
-23.82	26.40	2.36
-28.48	31.06	2.14
-31.59	34.17	1.98
-36.25	38.83	1.49

Table 4-12 Dynamic Lateral Earth Pressure Distribution

ELEMENT	SHEAR FORCE (NS)	SHEAR FORCE (FW)	AXIAL
	(kips)	(kips)	(kips)
CV11	1,597	2,129	1,907
CV10	8,975	11,966	8,465
CV09	22,250	29,146	18,617
CV08	35,411	45,704	27,533
CV07	52,073	65,340	38,839
CV06	62,492	77,571	46,087
CV05	70,021	85,853	51,357
CV04	74,196	90,260	54,604
CV03	77,961	94,247	59,920
CV02	83,051	99,337	63,919
CV01	87,577	103,452	68,034

 Table 4-13 Seismic Design Shear and Axial Force Diagrams - PCCV

Table 4-14 Seismic Design Shear and Axial Force Diagrams - CIS

ELEMENT	SHEAR FORCE (NS) (kips)	SHEAR FORCE (EW) (kips)	AXIAL FORCE (kips)
IC09	2,864	2,112	1,360
IC08	7,674	6,818	5,444
IC18	7,024	6,168	4,896
IC71	2,496	2,184	1,508
IC72	2,002	1,797	1,185
IC61	5,796	5,374	3,708
IC62	6,214	6,009	3,993
IC05	28,045	30,985	21,229
IC15	29,310	31,249	21,361
IC04	37,505	39,444	29,556
IC14	38,758	40,538	29,732
IC03	45,389	47,611	35,479
IC02	55,829	58,051	46,789
IC01	66,004	68,226	56,039

	SHEAR	SHEAR	
	FORCE	FORCE	AXIAL
	(NS)	(EW)	FORCE
	(kips)	(kips)	(kips)
FH08	16,219	10,261	9,599
FH07	25,510	16,618	16,690
FH06	29,488	21,298	21,136
RE41	15,120	10,395	9,923
RE42	9,867	5,693	6,452
RE05	15,939	18,596	18,216
RE04	25,899	35,196	33,156
RE03	131,149	123,356	114,671
RE02	170,969	166,796	154,491
RE01	208,699	204,526	188,791

### Table 4-15 Seismic Design Shear and Axial Force Diagrams - R/B and FH/A

### Table 4-16 Seismic Design Shear Diagrams – PS/B

Elevation (ft)	SHEAR FORCE (NS) (kips)	SHEAR FORCE (EW) (kips)
49.21	1284	1580
44.04	2267	2749
38.88	6659	7926
31.21	8036	8230
23.54	9785	9887
16.44	10834	10909
9.35	11685	11723
2.25	16144	16072
-5.33	17212	16764
-10.17	17964	17622
-15.00	19231	19014
-20.67	19917	19708
-26.33	21934	21644
-31.29	25338	24892
-36.25	27008	26507



Figure 3-1 US-APWR Certified Seismic Design Response Spectra (CSDRS)



Figure 3-2 US-APWR CSDRS Compatible Acceleration Time Histories



Figure 3-3 ACS SASSI Model of R/B Complex



Figure 3-4 Example of ISRS Enveloping and Broadening for IC03 Horizontal Response



Figure 3-5 Example of ISRS Enveloping and Broadening for IC03 Vertical Response



Figure 3-6 ACS SASSI Model of PS/B



Figure 3-7 Computation of Seismic Floor Loads

## Appendix A

## Node Numbering for R/B Complex and PS/B Models

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Symbol	Description	l	_ocation (ft)	Node Numbers		
	Description	Х	Y	Z	14' Mesh	10' Mesh
CV11	Top of dome	0.00	0.00	230.17	2768	4008
CV10	7ft under dome top	0.00	0.00	225.00	2769	4009
CV09	Dome El. at 40 deg.	0.00	0.00	201.67	2770	4010
CV08	Dome El. at 15 deg.	0.00	0.00	173.08	2771	4011
CV07	Top of polar crane rail	0.00	0.00	145.58	2772	4012
CV06	Roof of MS/FW room	0.00	0.00	115.50	2773	4013
CV05	MS penetration	0.00	0.00	92.17	2774	4014
CV04	Operation floor level	0.00	0.00	76.42	2775	4015
CV03	FW penetration	0.00	0.00	68.25	2776	4016
CV02	R/B 3 <sup>rd</sup> floor level	0.00	0.00	50.17	2777	4017
CV01	R/B 2 <sup>nd</sup> floor level	0.00	0.00	25.25	2778	4018
CV00	PCCV Ground El	0.00	0.00	1.92	2779	4019

Table 1 – PCCV Lumped Mass Node Numbers

Oursela e l	Description	l	_ocation (ft)	Node Numbers		
Symbol	Description	Х	Y	Z	14' Mesh	10' Mesh
IC09	P/R room upper level	39.29	0.00	139.50	2780	4020
IC08	P/R room wall thickness change	39.29	0.00	112.33	2781	4021
IC72	Upper level of SG wall	7.29	44.03	112.00	2807	4047
IC71	Upper level of SG wall	8.11	-43.98	112.00	2806	4046
IC18	P/R support	39.24	0.00	110.75	2782	4022
IC62	Top of SG wall	3.88	37.65	96.58	2785	4025
IC61	Top of SG wall	3.94	-37.73	96.58	2784	4024
IC07	P/R room operation floor	36.25	0.12	76.42	2783	4023
IC05	Operation floor level	3.36	0.74	76.42	2786	4026
IC15	SG support level	3.36	0.74	59.17	2787	4027
IC04	R/B 3 <sup>rd</sup> floor level	1.92	-0.61	50.17	2788	4028
IC14	SG support level	1.92	-0.61	45.67	2789	4029
IC03	Reactor vessel support	-2.28	0.13	35.88	2790	4030
IC02	R/B 2 <sup>nd</sup> floor level	-2.38	-0.18	25.25	2791	4031
IC01	Pressure header room	1.22	0.05	16.00	2792	4032
IC00	CIS Ground Level	1.22	0.05	1.92	2793	4033

Table 2 – CIS Lumped Mass Node Numbers

Symbol	Description	L	_ocation (ft)	Node Numbers		
	Description	Х	Y	Z	14' Mesh	10' Mesh
FH08	FH/A roof	-116.67	17.44	154.50	2794	4034
FH07	Top of FH/A crane rail	-120.08	18.37	125.67	2795	4035
FH06	Center building roof	-120.81	17.41	101.00	2796	4036
RE05	MS/FW room roof	115.42	6.17	115.50	2799	4039
RE04	R/B 5 <sup>th</sup> floor (MS/FW room)	119.54	-7.83	101.00	2800	4040
RE41	R/B 5 <sup>th</sup> floor west roof	-28.46	-77.07	101.00	2797	4037
RE42	R/B 5 <sup>th</sup> floor east roof	3.48	79.00	101.00	2798	4038
RE03	R/B operation floor	9.95	2.01	76.42	2801	4041
RE02	R/B 3 <sup>rd</sup> floor	-5.50	-2.93	50.17	2802	4042
RE01	R/B 2 <sup>nd</sup> floor	-5.34	-4.09	25.25	2803	4043
RE00	RB Ground Floor	1.24	-0.25	3.58	2804	4044
BS01	Basement Lumped Mass	-12.83	-1.58	-23.00	3497	4737

Table 3 – R/B & FH/A Lumped Mass Node Numbers

Flags	Ou weak al	L	ocation (ft)	Node Numbers		
FIOOr	Symbol	Х	Y	Z	14' Mesh	10' Mesh
	115_10a	-120.48	80.75	154.5	3499	4739
	115_10b	-120.48	-39.42	154.5	3501	4741
FH08	115_10c	-120.48	-4.13	154.5	3503	4743
	115_10d	-120.48	45.25	154.5	3505	4745
	115_10e	-120.48	18.46	153.88	3507	4747
	115_30	94.67	70.5	122.33	3509	4749
	115_30a	79	88.33	122.33	3511	4751
	115_30b	82.35	54.42	122.33	3513	4753
	115_30c	111.33	70.5	122.33	3515	4755
	115_31	143.5	65.92	115.5	3517	4757
RE05	115_32	143.5	99	115.5	3519	4759
	115_33a	94.67	19.42	115.5	3521	4761
	115_33b	94.67	-19.42	115.5	3523	4763
	115_33c	143.5	14	115.5	3525	4765
	115_33d	143.5	-14	115.5	3527	4767
	115_40	143.5	-62.71	115.5	3529	4769

 Table 4 – Slab Vertical SDOF Mass Node Numbers

Fleer	Quere had	Location (ft)			Node Numbers	
FIOUI	Symbol	Х	Y	Z	14' Mesh	10' Mesh
	101_10a	-120.79	-80.17	101	3531	4771
	101_10b	-79	-80.17	101	3533	4773
	101_11	-43.17	-72.38	101	3535	4775
	101_12b	-77.08	-53.75	101	3537	4777
NE41	101_40	39	-76.83	101	3539	4779
	101_41a	68.33	-83.25	101	3541	4781
	101_41b	68.33	-50.17	101	3543	4783
	101_43a	110.5	-50.17	101	3545	4785
	101_21	-57.79	40.54	112	3547	4787
	101_22	-70.08	57.63	112	3549	4789
RE42	101_23	-56.58	79.63	112	3551	4791
	101_23a	-56.58	79.63	112	3553	4793
	101_24a	-56.58	99.08	112	3555	4795
RE04	101_30	42.5	73.75	101	3557	4797
	101_30a	42.5	73.75	101	3559	4799
	101_33a	110.5	81.58	101	3561	4801

 Table 4 – Slab Vertical SDOF Mass Node Numbers- Continued

Floor	Symbol	L	ocation (ft)	Node Numbers		
FIOUI		Х	Y	Z	14' Mesh	10' Mesh
	86_14	-74.83	-81.08	88.42	3563	4803
	86_16	-77.08	-54.67	85.25	3565	4805
	86_17b	-82.21	-26.71	86.92	3567	4807
	76_10a	-43.17	-76.83	76.5	3569	4809
	76_10b	-78.83	-80.42	76.5	3571	4811
	76_10c	-78.83	-54	76.5	3573	4813
	76_11a	-100.42	-98.58	76.5	3575	4815
	76_13	-81.83	1.67	76.5	3577	4817
	76_20a	-58.33	76.71	76.5	3579	4819
	76_21g	-142.63	76.71	76.5	3581	4821
RE03	76_30a	52	65.83	76.5	3583	4823
	76_30b	52	65.83	76.5	3585	4825
	76_30c	52	65.83	76.5	3587	4827
	76_31b	87.67	19.42	76.5	3589	4829
	76_33a	110.5	62.75	76.5	3591	4831
	76_33b	143.5	62.75	76.5	3593	4833
	76_40a	52	-65.5	76.5	3595	4835
	76_41c	87.67	-19.42	76.5	3597	4837
	76_43a	110.5	-62.71	76.5	3599	4839
	76_43b	143.5	-62.71	76.5	3601	4841

Table 4 – Slab Vertical SDOF Mass Node Numbers- Continued
Floor	Symbol	L	ocation (ft)		Node Numbers	
FIOU	Floor Symbol	Х	Y	Z	14' Mesh	10' Mesh
	50_10b	-78.83	-65.75	50.17	3603	4843
	50_20b	-78.83	75.88	50.17	3605	4845
	50_21b	-132.42	98.58	50.17	3607	4847
	50_21c	-142.88	75.88	50.17	3609	4849
	50_21d	-116.88	75.88	50.17	3611	4851
	50_21e	-132.42	52.88	50.17	3613	4853
	50_22a	-87.46	20.83	50.17	3615	4855
	50_30a	42.5	77	50.17	3617	4857
RE02	50_30b	71.83	82.67	50.17	3619	4859
	50_32c	110.5	56	50.17	3621	4861
	50_33d	143.5	59.88	50.17	3623	4863
	50_34	127	19.42	50.17	3625	4865
	50_40b	71.83	-81.08	50.17	3627	4867
	50_42e	110.5	-54.42	50.17	3629	4869
	50_43d	143.5	-58.29	50.17	3631	4871
	50_44	127	-19.42	50.17	3633	4873
	35_26	0	100.08	40.67	3635	4875

Table 4 – Slab Vertical SDOF Mass Node Numbers- Continued

Eleor	Symbol	Location (ft)			Node Numbers	
FIOOI	Floor Symbol	Х	Y	Z	14' Mesh	10' Mesh
	25_20a	-121.5	29.73	25.25	3637	4877
	25_20b	-132.42	52.88	25.25	3639	4879
	25_20c	-104.92	59.67	25.25	3641	4881
	25_20d	-142.88	75.88	25.25	3643	4883
	25_20e	-119.71	75.88	25.25	3645	4885
	25_20f	-132.42	98.58	25.25	3647	4887
	25_22e	-78.83	75.88	25.25	3649	4889
	25_23	-43.17	75.88	25.25	3651	4891
DE01	25_30b	42.5	77	25.25	3653	4893
	25_33b	116.5	56	25.25	3655	4895
	25_33d	143.5	56	25.25	3657	4897
	25_34b	133	19.42	25.25	3659	4899
	25_42d	139.5	-95.79	25.25	3661	4901
	25_43d	143.5	-54.42	25.25	3663	4903
	25_44b	133	-19.42	25.25	3665	4905
	13_17	-127.04	-54.25	14.33	3667	4907
	13_31	149.42	95.79	14.08	3669	4909
	13_42	143.5	-95.79	14.08	3671	4911

Table 4 – Slab Vertical SDOF Mass Node Numbers- Continued

Eleor	Symbol	L	ocation (ft)		Node Numbers		
FIOU	Symbol	Х	Y	Z	14' Mesh	10' Mesh	
	3_32a	133	54.42	3.58	3673	4913	
	3_32b	133	19.42	3.58	3675	4915	
	3_32c	133	-19.42	3.58	3677	4917	
	3_32d	133	-54.42	3.58	3679	4919	
RE00	3_10a	-78.83	-75.88	3.58	3681	4921	
	3_20a	-78.83	76.88	3.58	3683	4923	
	3_15c	-127.92	-41.25	3.58	3685	4925	
	3_15d	-127.92	-23.29	3.58	3687	4927	
	3_15	-131.54	39.04	3.58	3689	4929	
	n8_10a	-84.33	-70.83	-8.58	3691	4931	
	n8_11c	-100.42	-95.79	-8.58	3693	4933	
	n8_13	-127.04	-74.04	-8.58	3695	4935	
	n8_14b	-127.04	-40.42	-8.58	3697	4937	
BS01	n8_16	-127.04	7.25	-8.58	3699	4939	
	n8_21c	-104.92	67.5	-8.58	3701	4941	
	n8_22a	-84.33	64.58	-8.58	3703	4943	
	n8_30a	84.67	64.58	-8.58	3705	4945	
	n8_40a	84.67	-70.83	-8.58	3707	4947	

 Table 4 – Slab Vertical SDOF Mass Node Numbers- Continued

Eleor	Symbol	L	Location (ft)		Node Numbers	
FIOOI	Symbol	Х	Y	Z	14' Mesh	10' Mesh
	W_N_1a	-152.17	21.06	114.31	3709	4949
	W_N_1b	-152.17	-35.69	114.31	3711	4951
FTIO7	W_N_1c	-152.17	79.81	114.31	3713	4953
	W_N_1d	-152.17	18.46	114.31	3715	4955
	W_S_3	161.67	-19.42	88.58	3725	4965
	W_S_4	161.67	19.42	88.58	3727	4967
DE04	W_S_5	161.67	-61.88	94.29	3729	4969
	W_S_6	161.67	61.88	94.29	3731	4971
	W_P1n	127	61.88	92.63	3733	4973
	W_P2n	127	-61.88	92.63	3735	4975
DE03	W_S_9	161.67	-61.88	61.63	3721	4961
RE03	W_S_10	161.67	61.88	61.63	3723	4963
DE02	W_N_3	-147.25	76.71	36.04	3719	4959
IXL02	W_N_2	-147.25	-41.04	49.17	3717	4957
	W_S_21	161.67	-19.42	-11.38	3737	4977
DEUU	W_S_22	161.67	19.42	-11.38	3739	4979
	W_S_25	161.67	-88.33	-11.38	3741	4981
	W_S_26	161.67	18.33	-11.38	3743	4983

Table 5 – N-S Walls Horizontal SDOF Mass Node Numbers

Eleor	Symbol	l	_ocation (ft)		Node Numbers		
FIUUI	Symbol	Х	Y	Z	14' Mesh	10' Mesh	
FH07	W_E_1	-120.48	106.67	114.31	3745	4985	
DE42	W_E_2	-37.83	106.67	92.54	3777	5017	
NE42	W_E_3	18.5	106.67	87.04	3779	5019	
RE41	W_W_2	-9.5	-106.67	83.96	3775	5015	
	W_E_7	144.33	106.67	94.29	3763	5003	
	W_W_1	145.08	-106.67	94.29	3765	5005	
DE04	W_P1e	144.33	84.92	92.63	3767	5007	
	W_P1w	144.33	38.83	92.63	3769	5009	
	W_P2e	144.33	-38.83	92.63	3771	5011	
	W_P2w	144.33	-84.92	92.63	3773	5013	
	W_E_4a	-44.4	106.67	61.63	3757	4997	
	W_E_4b	-44.4	106.67	61.63	3759	4999	
RE03	W_E_5	41.92	106.67	61.63	3761	5001	
	W_W_5	38.96	-106.67	61.63	3753	4993	
	W_W_6	-47.83	-106.67	61.63	3755	4995	
	W_W_8	-65.17	-106.67	36.04	3747	4987	
RE02	W_E_6	-44.4	106.67	36.04	3749	4989	
	W_P3e	-128.08	-13.92	47.53	3751	4991	
RE00	W_E_8	-131.54	106.67	-11.38	3781	5021	

Table 6 – E-W Walls Horizontal SDOF Mass Node Numbers

	Cumhal		Location (ft)		Node N	Node Numbers		
Floor	Symbol	Х	Y	Z	14' Mesh	10' Mesh		
	NE08	-146.58	106.67	154.5	2869	4109		
	NW08	-146.58	-71.42	154.5	2875	4115		
	RFS1	-120.48	17.63	154.5	2902	4142		
FH08	5FN1	-120.48	-70	154.5	2909	4149		
	5FN2	-120.48	105	154.5	2910	4150		
	5FE1	-151.29	17.63	154.5	2911	4151		
	5FE2	-89.67	17.63	154.5	2912	4152		
	NE07	-146.58	106.67	125.67	2870	4110		
	NW07	-146.58	-71.42	125.67	2876	4116		
ELIOS	NE06	-146.58	106.67	101	2871	4111		
ГПОО	NW06	-146.58	-71.42	101	2877	4117		
	SW05	161.67	-106.67	115.5	2859	4099		
	SE05	161.67	106.67	115.5	2864	4104		
	RFS2	144.29	-13.58	115.5	2903	4143		
	RFS3	144.29	13.58	115.5	2904	4144		
RE05	RFS4	93.88	71.92	115.5	2905	4145		
	RFS5	143.5	95.5	115.5	2906	4146		
	4FN3	143.5	105	115.5	2915	4155		
	4FE1	160	-19.42	115.5	2916	4156		
	4FE2	160	19.42	115.5	2917	4157		
	RFS7	-56.4	81.96	101	2908	4148		
	4FN2	6	105	101	2914	4154		
	RFS6	-119.79	-82.46	101	2907	4147		
	4FN1	-32.21	-105	101	2913	4153		

Table 7 – R/B and FH/A Outrigger Node Numbers

Elect Symbol			Location (ft)			Node Numbers		
FIOO	Symbol	Х	Y	Z	14' Mesh	10' Mesh		
	SW04	161.67	-106.67	101	2860	4100		
RE04	SE04	161.67	106.67	101	2865	4105		
	NW04	-146.58	-106.67	101	2878	4118		
	SW03	161.67	-106.67	76.42	2861	4101		
	SE03	161.67	106.67	76.42	2866	4106		
RE03	NE03	-146.58	106.67	76.42	2872	4112		
	NW03	-146.58	-106.67	76.42	2879	4119		
	SW02	161.67	-106.67	50.17	2862	4102		
	SE02	161.67	106.67	50.17	2867	4107		
	NE02	-146.58	106.67	50.17	2873	4113		
	NW02	-146.58	-106.67	50.17	2880	4120		
RE02	3FS1	110.21	55.88	50.17	2918	4158		
	3FS2	127	19.42	50.17	2919	4159		
	3FS3	127	-19.42	50.17	2920	4160		
	3FS4	110.21	-55.88	50.17	2921	4161		
	3FS5	-79.67	77.17	50.17	2922	4162		
	SW01	161.67	-106.67	25.25	2863	4103		
	SE01	161.67	106.67	25.25	2868	4108		
RE01	NE01	-146.58	106.67	25.25	2874	4114		
	NW01	-146.58	-106.67	25.25	2881	4121		
	2FS1	131.5	-19.42	25.25	2923	4163		
	SW00	161.67	-106.67	0.67	2743	3978		
	SE00	161.67	106.67	0.67	2767	4007		
IXL00	NE00	-147.25	106.67	0.67	2297	3355		
	NW00	-147.25	-106.67	0.67	2273	3326		
	SWB1	161.67	-106.67	-17.83	1820	2705		
BS01	SEB1	161.67	106.67	-17.83	1844	2734		
0301	NEB1	-147.25	106.67	-17.83	1526	2345		
	NWB1	-147.25	-106.67	-17.83	1502	2316		

Table 7 – R/B and FH/A Outrigger Node Numbers- Continued

Floor Symbol		Location (ft)			Node Numbers		
FIUUI	Symbol	Х	Y	Z	14' Mesh	10' Mesh	
	W7	48.25	0.00	139.50	2931	4171	
IC09	S5	40.50	0.00	139.50	2936	4176	
	S6	38.58	0.00	139.50	2937	4177	
IC08	W6	47.75	0.00	112.33	2930	4170	
IC61	W51	14.33	-47.83	96.58	2928	4168	
IC62	W52	14.33	47.83	96.58	2929	4169	
	W3	38.33	38.42	76.42	2926	4166	
1005	W4	3.33	17.50	76.42	2927	4167	
1005	S3	61.25	0.00	76.42	2934	4174	
	S4	46.92	48.08	76.42	2935	4175	
	W2	38.33	38.42	50.17	2925	4165	
IC04	S1	61.25	0.00	50.17	2932	4172	
	S2	47.33	47.58	50.17	2933	4173	
	W1	71.00	0.00	25.25	2924	4164	
IC02	S7	0.00	-59.58	25.25	2938	4178	
	S8	59.58	0.00	25.25	2939	4179	

Table 8 – CIS Outrigger Node Numbers

Floor	Sumbol		Location (ft)		Node
FIUUI	Symbol	Х	Y	Z	Numbers
	BM01	-34.67	-57.42	-26.33	495
	BM02	34.67	-57.42	-26.33	507
Basemat	BM03	0.00	5.09	-26.33	631
	BM04	-34.67	57.42	-26.33	729
	BM05	34.67	57.42	-26.33	741
	GS01	-34.67	-57.42	2.25	1296
	GS02	34.67	-57.42	2.25	1308
	GS03	-17.33	-45.25	2.25	1325
	GS04	17.50	-45.25	2.25	1331
	GS05	-17.33	-15.87	2.25	1390
Cround	GS06	-17.33	17.92	2.25	1455
Floor	GS07	0.00	5.09	2.25	1432
11001	GS08	17.50	-15.87	2.25	1396
	GS09	17.50	17.92	2.25	1461
	GS10	-17.33	43.92	2.25	1507
	GS11	17.50	43.92	2.25	1513
	GS12	-34.67	57.42	2.25	1530
	GS13	34.67	57.42	2.25	1542
	RF01	-34.67	-57.42	38.88	1918
	RF02	34.67	-57.42	38.88	1930
Roof	RF03	0.00	5.09	38.88	2054
	RF04	-34.67	57.42	38.88	2146
	RF05	34.67	57.42	38.88	2158

Table 9 – PS/B Node Numbers

# Appendix B

## **R/B Complex Node Grouping for ISRS Plots**

for the US-APWR Standard Plant

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	Dimention	Location	Envelope of ARS at	
ISKS Symbol	Direction	Description	Elev.	Node
CV11OR_(x,y,z)	x y z	Top of Dome	230'-2"	CV11
CV10OR_(x,y,z)	x y z	7ft under Dome Top	225'-0"	CV10
CV09OR_(x,y,z)	x y z	Dome El. at 40 deg.	201'-8"	CV09
CV08OR_(x,y,z)	x y z	Dome El. at 15 deg.	173'-1"	CV08
CV07OR_(x,y,z)	x y z	Top of Polar Crane Rail	145'-7"	CV07
CV06OR_(x,y,z)	x y z	Roof of MS/FW Room	115'-6"	CV06
CV05OR_(x,y,z)	x y z	MS Penetration	92'-2"	CV05
CV04OR_(x,y,z)	x y z	Operation Floor Level	76'-5"	CV04
CV03OR_(x,y,z)	x y z	FW Penetration	68'-3"	CV03
CV02OR_(x,y,z)	x y z	R/B 3 <sup>rd</sup> floor level	50'-2"	CV02
CV01OR_(x,y,z)	x y z	R/B 2 <sup>nd</sup> floor level	25'-3"	CV01
CV00OR_(x,y,z)	x y z	PCCV Ground El	1'-11"	CV00

Table 1 – ISRS for Prestressed Concrete Containment Vessel (PCCV)

Table 2 – ISRS for Containment Internal Structure (CIS)

ISRS Symbol	Direction	Location		Envolope of ADS at Nodes					
		Description	Elev.	Envelope of AKS at Nodes					
ICSGOR_(x,y,z)	x y z	Top of SG wall	112'-0"	IC61	W51	IC62	W52	IC71	IC72
$ICP3OR_(x,y,z)$	x y z	Upper Pressurizer	139'-6"	IC09	W7	S5			
$ICP2OR_(x,y,z)$	x y z	Middle Pressurizer	112'-4"	IC08	IC18	W6			
ICP1OR_(x,y,z)	x y z	Lower Pressurizer	76'-5"	IC07	S3				
$IC05OR_(x,y,z)$	x y z	Operation floor	76'-5"	IC05	W3	W4	S4		
$IC15OR_(x,y,z)$	x y z	SG Support	59'-2"	IC15					
$IC04OR_{(x,y,z)}$	x y z	SG Support	50'-2"	IC04	W2	<b>S</b> 1	S2	IC14	
$IC03OR_(x,y,z)$	x y z	RV Support	35'-9"	IC03					
$IC02OR_(x,y,z)$	x y z	R/B 2 <sup>nd</sup> Floor Level	25'-3"	IC02	W1	S7	<b>S</b> 8		
IC01OR_(x,y,z)	x y z	Pressure Header Room	16'-0"	IC01					
IC00OR_(x,y,z)	x y z	CIS Ground Level	1'-11"	IC00					

ISRS		Location								
Symbol Dir.		Description	N-S CL	EW CL	Elev.	Envelope of ARS at Nodes				
FH08OR	X Y Z	FH/A Roof	AR-CR	3R-11R	154'-8"	FH08	NE08	NW08	RFS1	
THOSOK			AR-CR	JICHIN	154-0	5FN1	5FN2	5FE1	5FE2	
FH07OR	XYZ	Top of FH/A crane rail	AR-CR	3R-11R	125'-4"	FH07	NE07	NW07		
FH06OR	XYZ	Center Building Roof	AR-CR	3R-11R	101'-0"	FH06	NE06	NW06		
						RE05	SW05	SE05	RFS2	
RE05OR	XYZ	MS/FW Room	HR-LR	1R-11R	115'-6"	RFS3	RFS4	RFS5	4FN3	
		KOOI				4FE1	4FE2			
RE42OR	XYZ	R/B 5 <sup>th</sup> Floor East Roof	CR-HR	5R-11R	101'-0"	RE42	RFS7	4FN2		
RE41OR	XYZ	R/B 5 <sup>th</sup> Floor West Roof	AR-LR	1R-5R	101'-0"	RE41	RFS6	4FN1	NW04	
RE04OR	XYZ	R/B 5 <sup>th</sup> Floor MS/FW Room	GR-LR	5R-11R	101'-0"	RE04	SW04	SE04		
DE02OD	VV7	<b>R/B</b> Operation		1D 11D	761 511	RE03	SW03	SE03	NE03	
REUSOR	AIL	Floor	AK-LK	IK-IIK	70-3	NW03				
						RE02	SW02	SE02	NE02	
RE02OR	XYZ	R/B 3 <sup>rd</sup> Floor	AR-LR	1R-11R	50'-2"	NW02	3FS1	3FS2	3FS3	
						3FS4	3FS5			
RE01OR	X Y Z	B/B 2 <sup>nd</sup> Floor	AR-IR	1R-11R	25'-3"	RE01	SW01	SE01	NE01	
REDIOR	AIL	ND 2 11001			23 3	NW01	2FS1			
RE00OR	XYZ	R/B Ground Floor	AR-LR	1R-11R	3'-7"	RE00 NW00	SW00	SE00	NE00	
BS01OR	XYZ	R/B Basement	AR-LR	1R-11R	-8'-7"	BS01 NWB1	SWB1	SEB1	NEB1	

#### Table 3 – ISRS for Reactor Building (R/B) and Fuel Handling Area (FHA) Rigid Walls/Slabs

ISRS Symbol	Dir.	Description	Elev.	Envelope of ARS at Nodes			
FH08Z1	Z	FH/A Roof, Slab Zone 1	154'-8"	115_10a 115_10e	115_10b	115_10c	115_10d
RE05Z1	Z	MS/FW Room Roof, Slab Zone 1	115'-6"	115_31 115_40	115_32 115_33a	115_33c 115_33b	115_33d
RE05Z2	Z	MS/FW Room Roof, Slab Zone 1	115'-6"	115_30a	115_30b	115_30c	115_30
RE42Z1	Z	R/B 5 <sup>th</sup> Floor East Roof, Slab Zone 1	101'-0"	101_22 101_23	101_23a	101_24a	101_21
RE41Z1	Z	R/B 5 <sup>th</sup> Floor West Roof, Slab Zone 1	101'-0"	101_10a	101_10b		
RE41Z2	Z	R/B 5 <sup>th</sup> Floor West Roof, Slab Zone 1	101'-0"	101_12b	101_41b	101_43a	
RE41Z3	Z	R/B 5 <sup>th</sup> Floor West Roof, Slab Zone 1	101'-0"	101_11	101_40	101_41a	
RE04Z1	Z	R/B 5 <sup>th</sup> Floor MS/FW Room, Slab Zone 1	101'-0"	101_30a	101_33a	101_30	
RE03Z1	Z	R/B Operation Floor, Slab Zone 1	76'-5"	86_17b	76_33b	76_43b	
RE03Z2	Z	R/B Operation Floor, Slab Zone 1	76'-5"	86_14 76_43a	76_10b	76_13	76_21g
RE03Z3	Z	R/B Operation Floor, Slab Zone 1	76'-5"	86_16	76_10c	76_11a	76_20a
RE03Z4	Z	R/B Operation Floor, Slab Zone 1	76'-5"	76_33a 76_31b	76_10a 76_30a	76_40a 76_30b	76_41c 76_30c
RE02Z1	Ζ	R/B 3 <sup>rd</sup> Floor, Slab Zone 1	50'-2"	50_21b	50_21c	50_21d	50_21e
RE02Z2	Ζ	R/B 3 <sup>rd</sup> Floor, Slab Zone 1	50'-2"	50_20b	50_22a	50_33d	50_43d
RE02Z3	Ζ	R/B 3 <sup>rd</sup> Floor, Slab Zone 1	50'-2"	50_30a	50_30b	50_40b	
<b>PE027</b> 4	Z	R/B 3 <sup>rd</sup> Floor, Slab Zone 1	50'-2"	50_10b	50_32c	50_34	50_44
NEU2Z4				50_42e	35_26		
RE01Z1	Ζ	R/B 2 <sup>nd</sup> Floor, Slab Zone 1	25'-3"	25_30b	25_33b	25_42d	
RE01Z2	Ζ	R/B 2 <sup>nd</sup> Floor, Slab Zone 1	25'-3"	25_33d	25_34b	25_43d	25_44b
RE01Z3	Ζ	R/B 2 <sup>nd</sup> Floor, Slab Zone 1	25'-3"	25_20b	25_20d	25_20e	25_20f

#### Table 4 – ISRS for Reactor Building (R/B) and Fuel Handling Area (FHA) Flexible Walls/Slabs

	<b>D</b> '							
ISKS Symbol	Dir.	Description	Elev.	Envelope of ARS at Nodes			S	
RE01Z4	Z	R/B 2 <sup>nd</sup> Floor, Slab Zone 1	25'-3"	25_20a	13_31	13_42		
RE01Z5	Z	R/B 2 <sup>nd</sup> Floor, Slab Zone 1	25'-3"	25_20c	25_22e	25_23	13_17	
RE00Z1	Ζ	Rb Ground Floor, Slab Zone 1	3'-7"	3_32a	3_32d			
RE00Z2	Ζ	Rb Ground Floor, Slab Zone 1	3'-7"	3_32b	3_32c			
<b>DE0072</b>	Z	Ph Ground Floor Slob Zono 1	2, 7,,	3_10a	3_20a	3_15c	3_15d	
KE00Z5		Ko Ground Ploor, Slab Zone I	5-7	3_15				
BS01Z1	Ζ	R/B Basement, Slab Zone 1	-8'-7"	n8_10a	n8_11c	n8_16		
<b>BS0172</b>	7	D/D Degement Slah Zang 1	0, 7,,	n8_13	n8_14b	n8_21c	n8_22a	
D50122	L	NB Basement, Stab Zone 1	-0 -/	n8_30a	n8_40a			
FH07X1	X	Top Of FH/A Crane Rail, Walls Running E-W	125'-4"	W_N_1a	W_N_1b	W_N_1c	W_N_1d	
DE04V1	v	R/B 5 <sup>th</sup> Floor MS/FW Room, Walls Running E-W	1011.01	W_S_3	W_S_4	W_S_5	W_S_6	
KE04A1			101'-0"	W_P1n	W_P2n			
RE03X1	X	R/B Operation Floor, Walls Running E-W	76'-5"	W_S_9	W_S_10			
RE02X1	х	R/B 3 <sup>rd</sup> Floor, Walls Running E-W	50'-2"	W_N_3	W_N_2			
RE00X1	Х	R/B Ground Floor, Walls Running E-W	3'-7"	W_S_21	W_S_22	W_S_25	W_S_26	
FH07Y1	Y	Top Of FH/A Crane Rail, Walls Running N-S	125'-4"	W_E_1				
RE42Y1	Y	R/B 5 <sup>th</sup> Floor East Roof, Walls Running N-S	101'-0"	W_E_2	W_E_3			
RE41Y1	Y	R/B 5 <sup>th</sup> Floor West Roof, Walls Running N-S	101'-0"	W_W_2				
PE04V1	Y	R/B 5 <sup>th</sup> Floor MS/FW Room, Walls Running N-S	101'-0"	W_E_7	$W_W_1$	W_P1e	W_P1w	
KE04 I I				W_P2e	W_P2w			
RE03V1	v	R/B Operation Floor, Walls	761 5"	W_E_4a	W_E_4b	W_E_5	W_W_5	
	1	Running N-S	70-5	W_W_6				
RE02Y1	Y	R/B 3 <sup>rd</sup> Floor, Walls Running N-S	50'-2"	W_W_8	W_E_6	W_P3e		
RE00Y1	Y	RB Ground Floor, Walls Running N-S	3'-7"	W_E_8				

#### Table 4 – ISRS for Reactor Building (R/B) and Fuel Handling Area (FHA) Flexible Walls/Slabs-Continued

Figure 1 – ISRS Symbol at Elevation 3'-7"



Security-Related Information – Withheld Under 10 CFR 2.390 Figure 2 – ISRS Symbol at Elevation 13'-6"

Figure 3 – ISRS Symbol at Elevation 25'-3"



Figure 4 – ISRS Symbol at Elevation 35'-2"

Figure 5 – ISRS Symbol at Elevation 50'-2"

Figure 6 – ISRS Symbol at Elevation 65'-0"

Figure 7 – ISRS Symbol at Elevation 76'-5"



Figure 8 – ISRS Symbol at Elevation 86'-4"



Figure 9 – ISRS Symbol at Elevation 101'-0"



Figure 10 – ISRS Symbol at Elevation 115'-6"

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Figure 1 – CV00 ISRS N-S Direction



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Figure 3 – CV02 ISRS N-S Direction



Figure 4 – CV03 ISRS N-S Direction



Figure 5 – CV04 ISRS N-S Direction



Figure 6 – CV05 ISRS N-S Direction



Figure 7 – CV06 ISRS N-S Direction



Figure 8 – CV07 ISRS N-S Direction



Figure 9 – CV08 ISRS N-S Direction


Figure 10 – CV09 ISRS N-S Direction



Figure 11 – CV10 ISRS N-S Direction



Figure 12 – CV11 ISRS N-S Direction



Figure 13 – CV00 ISRS E-W Direction



Figure 14 – CV01 ISRS E-W Direction



Figure 15 – CV02 ISRS E-W Direction



Figure 16 – CV03 ISRS E-W Direction



Figure 17 – CV04 ISRS E-W Direction



Figure 18 – CV05 ISRS E-W Direction



Figure 19 – CV06 ISRS E-W Direction



Figure 20 – CV07 ISRS E-W Direction



Figure 21 – CV08 ISRS E-W Direction



Figure 22 – CV09 ISRS E-W Direction



Figure 23 – CV10 ISRS E-W Direction



Figure 24 – CV11 ISRS E-W Direction



Figure 25 – CV00 ISRS Vertical Direction



Figure 26 – CV01 ISRS Vertical Direction



Figure 27 – CV02 ISRS Vertical Direction



Figure 28 – CV03 ISRS Vertical Direction



Figure 29 – CV04 ISRS Vertical Direction



Figure 30 – CV05 ISRS Vertical Direction



Figure 31 – CV06 ISRS Vertical Direction



Figure 32 – CV07 ISRS Vertical Direction



Figure 33 – CV08 ISRS Vertical Direction



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Figure 1 – IC00 ISRS N-S Direction



Figure 2 – IC01 ISRS N-S Direction



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Figure 4 – IC03 ISRS N-S Direction



Figure 5 – IC04 ISRS N-S Direction



Figure 6 – IC05 ISRS N-S Direction



Figure 7 – IC15 ISRS N-S Direction


Figure 8 – ICP1 ISRS N-S Direction



Figure 9 – ICP2 ISRS N-S Direction



Figure 10 – ICP3 ISRS N-S Direction



Figure 11 – ICSG ISRS N-S Direction



Figure 12 – IC00 ISRS E-W Direction



Figure 13 – IC01 ISRS E-W Direction



Figure 14 – IC02 ISRS E-W Direction



Figure 15 – IC03 ISRS E-W Direction



Figure 16 – IC04 ISRS E-W Direction



Figure 17 – IC05 ISRS E-W Direction



Figure 18 – IC15 ISRS E-W Direction



Figure 19 – ICP1 ISRS E-W Direction



Figure 20 – ICP2 ISRS E-W Direction



Figure 21 – ICP3 ISRS E-W Direction



Figure 22 – ICSG ISRS E-W Direction



Figure 23 – IC00 ISRS Vertical Direction



Figure 24 – IC01 ISRS Vertical Direction



Figure 25 – IC02 ISRS Vertical Direction



Figure 26 – IC03 ISRS Vertical Direction



Figure 27 – IC04 ISRS Vertical Direction



Figure 28 – IC05 ISRS Vertical Direction



Figure 29 – IC15 ISRS Vertical Direction



Figure 30 – ICP1 ISRS Vertical Direction



Figure 31 – ICP2 ISRS Vertical Direction



Figure 32 – ICP3 ISRS Vertical Direction



Figure 33 – ICSG ISRS Vertical Direction

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Figure 5 – RE03 ISRS N-S Direction



Figure 6 – RE04 ISRS N-S Direction



Figure 7 – RE05 ISRS N-S Direction


Figure 8 – RE41 ISRS N-S Direction



Figure 9 – RE42 ISRS N-S Direction



Figure 10 – FH06 ISRS N-S Direction



Figure 11 – FH07 ISRS N-S Direction



Figure 12 – FH08 ISRS N-S Direction



Figure 13 – BS01 ISRS E-W Direction



Figure 14 – RE00 ISRS E-W Direction



Figure 15 – RE01 ISRS E-W Direction







Figure 17 – RE03 ISRS E-W Direction



Figure 18 – RE04 ISRS E-W Direction



Figure 19 – RE05 ISRS E-W Direction



Figure 20 – RE41 ISRS E-W Direction



Figure 21 – RE42 ISRS E-W Direction



Figure 22 – FH06 ISRS E-W Direction



Figure 23 – FH07 ISRS E-W Direction



Figure 24 – FH08 ISRS E-W Direction



Figure 25 – BS01 ISRS Vertical Direction



Figure 26 – RE00 ISRS Vertical Direction



Figure 27 – RE01 ISRS Vertical Direction



Figure 28 – RE02 ISRS Vertical Direction



Figure 29 – RE03 ISRS Vertical Direction



Figure 30 – RE04 ISRS Vertical Direction



Figure 31 – RE05 ISRS Vertical Direction



Figure 32 – RE41 ISRS Vertical Direction



Figure 33 – RE42 ISRS Vertical Direction



Figure 34 – FH06 ISRS Vertical Direction



Figure 35 – FH07 ISRS Vertical Direction



Figure 36 – FH08 ISRS Vertical Direction



Figure 37 – RE00Y1 ISRS SDOF N-S Direction



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Figure 40 – RE04Y1 ISRS SDOF N-S Direction



Figure 41 – RE41Y1 ISRS SDOF N-S Direction



Figure 42 – RE42Y1 ISRS SDOF N-S Direction



Figure 43 – FH07Y1 ISRS SDOF N-S Direction


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Figure 46 – RE03X1 ISRS SDOF E-W Direction



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Figure 48 – FH07X1 ISRS SDOF E-W Direction



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Figure 51 – RE00Z1 ISRS SDOF Vertical Direction



Figure 52 – RE00Z2 ISRS SDOF Vertical Direction



Figure 53 – RE00Z3 ISRS SDOF Vertical Direction



Figure 54 – RE01Z1 ISRS SDOF Vertical Direction



Figure 55 – RE01Z2 ISRS SDOF Vertical Direction



Figure 56 – RE01Z3 ISRS SDOF Vertical Direction



Figure 57 – RE01Z4 ISRS SDOF Vertical Direction



Figure 58 – RE01Z5 ISRS SDOF Vertical Direction



Figure 59 – RE02Z1 ISRS SDOF Vertical Direction



Figure 60 – RE02Z2 ISRS SDOF Vertical Direction



Figure 61 – RE02Z3 ISRS SDOF Vertical Direction



Figure 62 – RE02Z4 ISRS SDOF Vertical Direction



Figure 63 – RE03Z1 ISRS SDOF Vertical Direction



Figure 64 – RE03Z2 ISRS SDOF Vertical Direction



Figure 65 – RE03Z3 ISRS SDOF Vertical Direction



Figure 66 – RE03Z4 ISRS SDOF Vertical Direction



Figure 67 – RE04Z1 ISRS SDOF Vertical Direction



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Figure 70 – RE41Z1 ISRS SDOF Vertical Direction



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Figure 72 – RE41Z3 ISRS SDOF Vertical Direction



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## Appendix F

## **ISRS Plots for PS/B**

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Figure 5 – Ground ISRS E-W Direction



Figure 6 – Roof ISRS E-W Direction



Figure 7 – Basemat ISRS Vertical Direction



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# Maximum Displacements, Maximum Accelerations, and Enveloped Forces for R/B Complex and PS/B

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\*Please note that these are the SASSI results. Additional margin is added to the design values provided in the main body of this report.

		SRS	S Maxim	ium Disp	lacemen	ts X-Res	sp (in)		
	270- 200	270- 500	560- 100	560- 200	560- 500	900- 100	900- 200	2032- 100	Max
FH08	1.351	1.241	0.925	1.024	0.897	0.673	0.630	0.684	1.351
NE08	1.351	1.241	0.926	1.024	0.898	0.678	0.634	0.688	1.351
NW08	1.352	1.242	0.923	1.023	0.896	0.668	0.626	0.680	1.352
FH07	1.216	1.103	0.816	0.903	0.784	0.458	0.481	0.473	1.216
RE05	1.092	0.992	0.700	0.787	0.674	0.234	0.262	0.203	1.092
FH06	1.091	0.977	0.713	0.791	0.680	0.288	0.338	0.277	1.091
RE41	1.044	0.940	0.662	0.744	0.635	0.211	0.235	0.172	1.044
RE42	1.043	0.938	0.664	0.743	0.635	0.212	0.240	0.172	1.043
RE04	1.048	0.942	0.667	0.748	0.644	0.216	0.240	0.181	1.048
RE03	0.968	0.853	0.609	0.681	0.576	0.186	0.203	0.142	0.968
NE03	0.968	0.853	0.610	0.682	0.577	0.188	0.208	0.144	0.968
NW03	0.970	0.854	0.607	0.681	0.575	0.184	0.200	0.140	0.970
SE03	0.968	0.853	0.610	0.682	0.577	0.188	0.208	0.144	0.968
SW03	0.970	0.854	0.607	0.681	0.575	0.184	0.200	0.140	0.970
RE02	0.886	0.760	0.544	0.607	0.509	0.165	0.171	0.106	0.886
RE01	0.805	0.670	0.480	0.536	0.442	0.158	0.164	0.069	0.805
RE00	0.736	0.592	0.421	0.475	0.383	0.151	0.157	0.036	0.736

Table 1 – Maximum Displacements for X-Dir. (R/B and FH/A)

Table 2 – Maximum Displacements for X-Dir. (PCCV)

		SRS	S Maxim	um Disp	lacemen	its X-Res	sp (in)		
	270- 200	270- 500	560- 100	560- 200	560- 500	900- 100	900- 200	2032- 100	Max
CV11	1.667	1.549	1.279	1.372	1.220	0.921	1.032	0.818	1.667
CV10	1.649	1.530	1.263	1.355	1.204	0.907	1.016	0.805	1.649
CV09	1.561	1.439	1.186	1.275	1.129	0.836	0.938	0.742	1.561
CV08	1.447	1.321	1.083	1.152	1.029	0.735	0.828	0.651	1.447
CV07	1.333	1.205	0.980	1.046	0.927	0.632	0.714	0.558	1.333
CV06	1.204	1.073	0.860	0.924	0.809	0.511	0.579	0.446	1.204
CV05	1.103	0.970	0.766	0.827	0.715	0.416	0.470	0.357	1.103
CV04	1.034	0.900	0.702	0.761	0.652	0.353	0.395	0.296	1.034
CV03	0.998	0.864	0.669	0.728	0.620	0.322	0.357	0.264	0.998
CV02	0.922	0.785	0.598	0.655	0.552	0.254	0.277	0.196	0.922
CV01	0.821	0.680	0.502	0.556	0.457	0.170	0.187	0.108	0.821
CV00	0.732	0.587	0.419	0.473	0.381	0.151	0.157	0.036	0.732

		SRS	S Maxim	um Disp	lacemen	ts X-Res	sp (in)		
	270- 200	270- 500	560- 100	560- 200	560- 500	900- 100	900- 200	2032- 100	Max
IC09	1.415	1.266	1.148	1.120	1.022	1.200	1.145	1.194	1.415
IC18	1.208	1.070	0.833	0.916	0.816	0.641	0.684	0.614	1.208
IC08	1.220	1.082	0.852	0.928	0.828	0.668	0.712	0.648	1.220
IC05	0.964	0.842	0.614	0.684	0.585	0.205	0.220	0.169	0.964
IC72	1.090	0.974	0.721	0.804	0.701	0.319	0.327	0.294	1.090
IC71	1.087	0.973	0.717	0.799	0.695	0.304	0.315	0.279	1.087
IC62	1.034	0.917	0.674	0.751	0.649	0.266	0.279	0.235	1.034
IC61	1.033	0.917	0.672	0.749	0.647	0.256	0.272	0.229	1.033
IC15	0.905	0.780	0.564	0.628	0.532	0.185	0.191	0.125	0.905
IC04	0.876	0.748	0.538	0.600	0.505	0.178	0.184	0.103	0.876
IC14	0.859	0.731	0.524	0.585	0.490	0.173	0.180	0.091	0.859
IC03	0.826	0.695	0.493	0.553	0.459	0.165	0.171	0.071	0.826
IC02	0.791	0.656	0.462	0.521	0.426	0.157	0.163	0.053	0.791
IC01	0.766	0.628	0.443	0.500	0.406	0.154	0.160	0.045	0.766
IC00	0.732	0.587	0.419	0.473	0.381	0.151	0.157	0.036	0.732

Table 3 – Maximum Displacements for X-Dir. (CIS)

		SRS	S Maxim	um Disp	lacemen	its Y-Res	sp (in)		
	270- 200	270- 500	560- 100	560- 200	560- 500	900- 100	900- 200	2032- 100	Max
FH08	1.500	1.492	1.073	1.031	0.995	0.574	0.655	0.435	1.500
NE08	1.502	1.492	1.072	1.031	0.995	0.569	0.651	0.432	1.502
NW08	1.502	1.492	1.072	1.031	0.995	0.569	0.651	0.432	1.502
FH07	1.357	1.354	0.953	0.925	0.880	0.498	0.565	0.360	1.357
RE05	1.254	1.279	0.872	0.850	0.811	0.459	0.510	0.293	1.279
FH06	1.225	1.228	0.836	0.830	0.772	0.417	0.472	0.277	1.228
RE41	1.204	1.219	0.820	0.810	0.763	0.416	0.463	0.265	1.219
RE42	1.196	1.214	0.815	0.809	0.756	0.409	0.455	0.250	1.214
RE04	1.183	1.210	0.813	0.802	0.755	0.422	0.468	0.260	1.210
RE03	1.070	1.090	0.707	0.721	0.653	0.338	0.377	0.191	1.090
NE03	1.086	1.093	0.705	0.727	0.651	0.318	0.359	0.179	1.093
NW03	1.086	1.093	0.705	0.727	0.651	0.318	0.359	0.179	1.093
SE03	1.055	1.086	0.708	0.716	0.654	0.358	0.395	0.203	1.086
SW03	1.055	1.086	0.708	0.716	0.654	0.358	0.395	0.203	1.086
RE02	0.944	0.962	0.601	0.636	0.551	0.270	0.302	0.134	0.962
RE01	0.830	0.839	0.498	0.552	0.454	0.207	0.234	0.082	0.839
RE00	0.742	0.734	0.413	0.482	0.374	0.158	0.188	0.042	0.742

Table 4 – Maximum Displacements for Y-Dir. (R/B and FH/A)

Table 5 – Maximum Displacements for Y-Dir. (PCCV)

		SRS	S Maxim	um Disp	lacemen	ts Y-Res	p (in)		
	270- 200	270- 500	560- 100	560- 200	560- 500	900- 100	900- 200	2032- 100	Max
CV11	2.104	2.015	1.600	1.498	1.440	1.258	1.351	0.974	2.104
CV10	2.076	1.984	1.578	1.474	1.419	1.239	1.331	0.958	2.076
CV09	1.945	1.838	1.470	1.367	1.318	1.143	1.229	0.875	1.945
CV08	1.776	1.652	1.326	1.238	1.188	1.010	1.088	0.759	1.776
CV07	1.608	1.468	1.183	1.100	1.059	0.873	0.943	0.639	1.608
CV06	1.416	1.307	1.017	0.965	0.911	0.713	0.774	0.498	1.416
CV05	1.267	1.187	0.887	0.860	0.794	0.587	0.640	0.388	1.267
CV04	1.165	1.106	0.799	0.789	0.716	0.502	0.549	0.314	1.165
CV03	1.114	1.064	0.753	0.753	0.676	0.459	0.503	0.277	1.114
CV02	1.000	0.971	0.654	0.674	0.589	0.367	0.406	0.199	1.000
CV01	0.847	0.844	0.523	0.570	0.471	0.250	0.281	0.107	0.847
CV00	0.738	0.728	0.410	0.479	0.370	0.157	0.187	0.041	0.738

		SRS	S Maxim	um Disp	lacemen	ts Y-Res	sp (in)		
	270- 200	270- 500	560- 100	560- 200	560- 500	900- 100	900- 200	2032- 100	Max
IC09	1.536	1.565	1.319	1.231	1.229	1.112	1.052	1.015	1.565
IC18	1.333	1.362	1.063	1.003	0.989	0.732	0.748	0.666	1.362
IC08	1.345	1.374	1.078	1.017	1.003	0.755	0.765	0.687	1.374
IC05	1.091	1.118	0.753	0.742	0.698	0.394	0.423	0.263	1.118
IC72	1.304	1.336	0.970	0.925	0.906	0.586	0.608	0.433	1.336
IC71	1.297	1.333	0.961	0.921	0.900	0.567	0.601	0.426	1.333
IC62	1.212	1.243	0.875	0.839	0.817	0.501	0.527	0.358	1.243
IC61	1.208	1.242	0.871	0.837	0.815	0.493	0.525	0.354	1.242
IC15	0.992	1.019	0.657	0.671	0.607	0.319	0.346	0.190	1.019
IC04	0.943	0.966	0.608	0.635	0.561	0.281	0.307	0.154	0.966
IC14	0.917	0.938	0.583	0.617	0.538	0.261	0.287	0.135	0.938
IC03	0.863	0.881	0.530	0.577	0.487	0.220	0.246	0.096	0.881
IC02	0.815	0.824	0.481	0.540	0.441	0.188	0.214	0.067	0.824
IC01	0.782	0.769	0.450	0.514	0.410	0.173	0.199	0.054	0.782
IC00	0.738	0.728	0.410	0.479	0.370	0.157	0.187	0.041	0.738

Table 6 – Maximum Displacements for Y-Dir. (CIS)

		SRS	S Maxim	num Disp	lacemer	its Z-Res	sp (in)		
	270- 200	270- 500	560- 100	560- 200	560- 500	900- 100	900- 200	2032- 100	Мах
FH08	0.403	0.448	0.241	0.300	0.277	0.161	0.165	0.124	0.448
NE08	0.696	0.767	0.478	0.530	0.500	0.325	0.331	0.277	0.767
NW08	0.590	0.653	0.394	0.449	0.422	0.285	0.275	0.248	0.653
FH07	0.412	0.457	0.248	0.308	0.284	0.164	0.167	0.128	0.457
RE05	0.373	0.406	0.231	0.287	0.262	0.164	0.165	0.126	0.406
FH06	0.410	0.456	0.244	0.306	0.282	0.158	0.160	0.122	0.456
RE41	0.413	0.449	0.269	0.303	0.281	0.159	0.177	0.109	0.449
RE42	0.419	0.448	0.282	0.309	0.292	0.172	0.197	0.115	0.448
RE04	0.382	0.416	0.236	0.294	0.269	0.166	0.167	0.128	0.416
RE03	0.220	0.216	0.119	0.157	0.138	0.097	0.103	0.038	0.220
NE03	0.661	0.738	0.437	0.494	0.467	0.245	0.273	0.194	0.738
NW03	0.655	0.734	0.431	0.488	0.462	0.243	0.267	0.189	0.734
SE03	0.673	0.748	0.454	0.512	0.483	0.272	0.294	0.217	0.748
SW03	0.670	0.744	0.448	0.508	0.478	0.262	0.285	0.211	0.744
RE02	0.217	0.216	0.115	0.154	0.135	0.092	0.098	0.028	0.217
RE01	0.215	0.215	0.114	0.151	0.132	0.089	0.096	0.023	0.215
RE00	0.209	0.209	0.110	0.146	0.127	0.086	0.093	0.017	0.209

Table 7 – Maximum Displacements for Z-Dir. (R/B and FH/A)

Table 8 – Maximum Displacements for Z-Dir. (PCCV)

		SRS	S Maxim	ium Disp	lacemen	its Z-Res	p (in)		
	270- 200	270- 500	560- 100	560- 200	560- 500	900- 100	900- 200	2032- 100	Max
CV11	0.244	0.227	0.154	0.199	0.161	0.141	0.127	0.121	0.244
CV10	0.240	0.224	0.149	0.194	0.158	0.130	0.119	0.109	0.240
CV09	0.234	0.221	0.139	0.183	0.152	0.108	0.114	0.085	0.234
CV08	0.230	0.220	0.134	0.177	0.148	0.102	0.111	0.072	0.230
CV07	0.228	0.218	0.132	0.174	0.147	0.101	0.109	0.067	0.228
CV06	0.226	0.217	0.128	0.170	0.144	0.099	0.107	0.059	0.226
CV05	0.223	0.217	0.125	0.166	0.141	0.097	0.105	0.052	0.223
CV04	0.221	0.216	0.122	0.163	0.139	0.095	0.103	0.046	0.221
CV03	0.220	0.215	0.121	0.162	0.138	0.095	0.102	0.043	0.220
CV02	0.217	0.214	0.117	0.158	0.135	0.093	0.100	0.035	0.217
CV01	0.214	0.212	0.113	0.152	0.131	0.090	0.096	0.025	0.214
CV00	0.209	0.210	0.110	0.147	0.127	0.086	0.093	0.017	0.210

		SRS	S Maxim	um Disp	lacemer	ts Z-Res	sp (in)		
	270- 200	270- 500	560- 100	560- 200	560- 500	900- 100	900- 200	2032- 100	Max
IC09	0.245	0.245	0.155	0.188	0.171	0.129	0.133	0.084	0.245
IC18	0.245	0.245	0.154	0.187	0.170	0.127	0.132	0.083	0.245
IC08	0.245	0.245	0.154	0.188	0.170	0.128	0.133	0.083	0.245
IC05	0.215	0.214	0.114	0.152	0.135	0.093	0.099	0.028	0.215
IC72	0.312	0.319	0.223	0.238	0.230	0.174	0.172	0.132	0.319
IC71	0.310	0.318	0.221	0.236	0.228	0.170	0.168	0.128	0.318
IC62	0.286	0.292	0.193	0.213	0.203	0.146	0.147	0.103	0.292
IC61	0.284	0.292	0.192	0.212	0.202	0.145	0.145	0.101	0.292
IC15	0.214	0.212	0.114	0.151	0.133	0.091	0.098	0.026	0.214
IC04	0.212	0.212	0.113	0.150	0.132	0.090	0.097	0.024	0.212
IC14	0.212	0.212	0.113	0.150	0.131	0.090	0.097	0.023	0.212
IC03	0.212	0.212	0.112	0.149	0.130	0.089	0.095	0.021	0.212
IC02	0.212	0.211	0.112	0.148	0.129	0.088	0.094	0.019	0.212
IC01	0.210	0.210	0.111	0.147	0.128	0.087	0.094	0.018	0.210
IC00	0.209	0.209	0.110	0.146	0.127	0.086	0.093	0.017	0.209

Table 9 – Maximum Displacements for Z-Dir. (CIS)

Table 10 – Maximum Accelerations of Major	r Elevations f	or X-Dir. (R/B and
	FH/A)	

			SRSS A	ccelerati	on X-Dir	ection (g	)		
	270- 200	270- 500	560- 100	560- 200	560- 500	900- 100	900- 200	2032- 100	Envelope
FH08	0.691	0.572	0.935	0.685	0.678	2.382	2.058	2.353	2.382
FH07	0.596	0.477	0.793	0.648	0.615	1.550	1.337	1.512	1.550
RE05	0.527	0.433	0.627	0.595	0.548	0.684	0.636	0.744	0.744
FH06	0.533	0.430	0.669	0.603	0.571	0.764	0.749	0.776	0.776
RE41	0.499	0.425	0.594	0.572	0.530	0.620	0.600	0.652	0.652
RE42	0.489	0.411	0.586	0.565	0.527	0.611	0.582	0.620	0.620
RE04	0.495	0.411	0.586	0.558	0.516	0.631	0.588	0.647	0.647
RE03	0.449	0.395	0.539	0.514	0.482	0.575	0.528	0.536	0.575
RE02	0.420	0.377	0.515	0.466	0.457	0.534	0.474	0.493	0.534
RE01	0.413	0.362	0.493	0.442	0.437	0.458	0.426	0.419	0.493
RE00	0.408	0.352	0.473	0.419	0.416	0.378	0.400	0.345	0.473

Table 11 – Maximum Accelerations of Major Elevations for X-Dir. (PCCV)

			SRSS A	ccelerati	on X-Dir	ection (g	)		
	270- 200	270- 500	560- 100	560- 200	560- 500	900- 100	900- 200	2032- 100	Envelope
CV11	0.870	0.702	1.253	1.004	0.940	1.685	1.787	1.457	1.787
CV10	0.856	0.685	1.230	0.991	0.926	1.650	1.760	1.428	1.760
CV09	0.804	0.641	1.132	0.928	0.874	1.507	1.630	1.286	1.630
CV08	0.734	0.584	0.997	0.843	0.811	1.370	1.459	1.137	1.459
CV07	0.666	0.528	0.870	0.769	0.748	1.228	1.285	1.033	1.285
CV06	0.588	0.467	0.765	0.681	0.664	1.054	1.106	0.906	1.106
CV05	0.544	0.442	0.708	0.644	0.613	0.908	0.971	0.793	0.971
CV04	0.512	0.424	0.673	0.614	0.586	0.804	0.869	0.712	0.869
CV03	0.493	0.414	0.653	0.595	0.570	0.749	0.813	0.673	0.813
CV02	0.450	0.396	0.603	0.547	0.529	0.627	0.687	0.579	0.687
CV01	0.421	0.374	0.533	0.476	0.465	0.471	0.510	0.438	0.533
CV00	0.408	0.352	0.472	0.418	0.415	0.378	0.400	0.345	0.472

Table 12 – Maximum Accelerations of Major Elevations for X-Dir. (C	XS)
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			SRSS A	ccelerati	on X-Dir	ection (g	)		
	270- 200	270- 500	560- 100	560- 200	560- 500	900- 100	900- 200	2032- 100	Envelope
IC09	1.066	0.902	1.512	1.102	1.263	3.921	3.356	3.786	3.921
IC18	0.680	0.558	1.047	0.738	0.823	1.837	1.599	1.777	1.837
IC08	0.700	0.573	1.076	0.758	0.848	1.959	1.702	1.894	1.959
IC05	0.483	0.421	0.588	0.565	0.539	0.694	0.661	0.688	0.694
IC72	0.694	0.604	0.897	0.737	0.750	1.349	1.101	1.458	1.458
IC71	0.696	0.611	0.875	0.732	0.735	1.260	1.104	1.361	1.361
IC62	0.567	0.487	0.717	0.626	0.613	1.015	0.888	1.016	1.016
IC61	0.563	0.484	0.719	0.622	0.609	0.990	0.884	0.979	0.990
IC15	0.445	0.403	0.553	0.532	0.507	0.533	0.544	0.538	0.553
IC04	0.442	0.400	0.546	0.515	0.499	0.472	0.510	0.493	0.546
IC14	0.436	0.393	0.538	0.500	0.488	0.447	0.480	0.463	0.538
IC03	0.426	0.379	0.520	0.472	0.470	0.409	0.415	0.405	0.520
IC02	0.414	0.364	0.501	0.451	0.445	0.393	0.395	0.362	0.501
IC01	0.411	0.357	0.489	0.436	0.432	0.386	0.398	0.353	0.489
IC00	0.408	0.352	0.472	0.418	0.415	0.378	0.400	0.345	0.472

Table 13 – Maximum Accelerations of Ma	ajor Elevations for Y-Dir. (R/B and
	FH/A)

			SRSS A	ccelerati	on Y-Dir	ection (g	)		
	270- 200	270- 500	560- 100	560- 200	560- 500	900- 100	900- 200	2032- 100	Envelope
FH08	0.696	0.552	0.891	0.737	0.710	1.359	1.392	1.160	1.392
FH07	0.594	0.486	0.800	0.603	0.633	1.037	1.065	0.938	1.065
RE05	0.546	0.491	0.709	0.612	0.587	0.860	0.908	0.793	0.908
FH06	0.522	0.471	0.707	0.529	0.565	0.753	0.808	0.720	0.808
RE41	0.591	0.549	0.708	0.649	0.609	0.912	0.891	0.920	0.920
RE42	0.531	0.476	0.693	0.558	0.577	0.770	0.782	0.785	0.785
RE04	0.519	0.478	0.667	0.559	0.546	0.779	0.793	0.683	0.793
RE03	0.494	0.458	0.596	0.485	0.483	0.621	0.626	0.549	0.626
RE02	0.469	0.435	0.519	0.440	0.443	0.489	0.491	0.448	0.519
RE01	0.458	0.412	0.464	0.390	0.394	0.447	0.413	0.410	0.464
RE00	0.447	0.392	0.412	0.347	0.342	0.421	0.398	0.348	0.447

 Table 14 – Maximum Accelerations of Major Elevations for Y-Dir. (PCCV)

			SRSS A	ccelerati	on Y-Dir	ection (g	)		
	270- 200	270- 500	560- 100	560- 200	560- 500	900- 100	900- 200	2032- 100	Envelope
CV11	1.090	1.034	1.394	1.218	1.090	2.154	2.349	1.874	2.349
CV10	1.071	1.014	1.373	1.196	1.071	2.117	2.306	1.844	2.306
CV09	0.989	0.919	1.272	1.091	0.984	1.929	2.096	1.692	2.096
CV08	0.889	0.808	1.136	0.968	0.899	1.667	1.813	1.484	1.813
CV07	0.790	0.706	1.000	0.872	0.828	1.423	1.552	1.261	1.552
CV06	0.666	0.584	0.844	0.769	0.748	1.205	1.274	0.982	1.274
CV05	0.578	0.485	0.754	0.690	0.679	1.018	1.061	0.754	1.061
CV04	0.550	0.438	0.698	0.633	0.625	0.886	0.918	0.687	0.918
CV03	0.535	0.427	0.667	0.602	0.595	0.815	0.842	0.652	0.842
CV02	0.498	0.403	0.597	0.530	0.524	0.658	0.676	0.569	0.676
CV01	0.450	0.398	0.499	0.425	0.423	0.464	0.467	0.457	0.499
CV00	0.447	0.391	0.410	0.346	0.340	0.421	0.398	0.348	0.447

			SRSS A	ccelerati	on Y-Dir	ection (g	)		
	270- 200	270- 500	560- 100	560- 200	560- 500	900- 100	900- 200	2032- 100	Envelope
IC09	0.834	0.751	1.310	1.083	1.172	2.917	2.582	2.815	2.917
IC18	0.665	0.595	0.966	0.762	0.819	1.838	1.695	1.766	1.838
IC08	0.675	0.602	0.986	0.777	0.834	1.897	1.746	1.827	1.897
IC05	0.517	0.475	0.645	0.510	0.550	0.810	0.784	0.731	0.810
IC72	0.601	0.565	0.871	0.723	0.767	1.471	1.373	1.438	1.471
IC71	0.663	0.575	0.867	0.728	0.761	1.304	1.219	1.246	1.304
IC62	0.543	0.507	0.766	0.621	0.665	1.108	0.982	0.939	1.108
IC61	0.541	0.510	0.747	0.612	0.648	1.020	0.951	0.890	1.020
IC15	0.487	0.452	0.557	0.435	0.469	0.659	0.647	0.626	0.659
IC04	0.474	0.442	0.519	0.422	0.433	0.585	0.580	0.582	0.585
IC14	0.468	0.435	0.502	0.412	0.415	0.544	0.540	0.549	0.549
IC03	0.463	0.423	0.475	0.391	0.395	0.494	0.470	0.470	0.494
IC02	0.459	0.411	0.448	0.371	0.372	0.457	0.435	0.409	0.459
IC01	0.453	0.401	0.432	0.358	0.358	0.438	0.417	0.381	0.453
IC00	0.447	0.391	0.410	0.346	0.340	0.421	0.398	0.348	0.447

Table 16 – Maximum Accelerations of Ma	jor Elevations for Z-Dir. (R/B and
	FH/A)

			SRSS A	ccelerati	on Z-Dir	ection (g	)		
	270- 200	270- 500	560- 100	560- 200	560- 500	900- 100	900- 200	2032- 100	Envelope
FH08	0.531	0.495	0.580	0.519	0.536	0.929	0.833	0.974	0.974
FH07	0.499	0.450	0.555	0.502	0.506	0.896	0.790	0.904	0.904
RE05	0.412	0.383	0.515	0.448	0.448	0.870	0.774	0.856	0.870
FH06	0.456	0.434	0.523	0.480	0.482	0.833	0.728	0.804	0.833
RE41	0.469	0.433	0.518	0.523	0.511	0.953	0.858	0.894	0.953
RE42	0.440	0.420	0.558	0.512	0.505	0.760	0.758	0.664	0.760
RE04	0.413	0.381	0.513	0.447	0.448	0.854	0.765	0.844	0.854
RE03	0.323	0.302	0.410	0.384	0.372	0.530	0.517	0.459	0.530
RE02	0.316	0.292	0.397	0.372	0.360	0.483	0.481	0.409	0.483
RE01	0.309	0.277	0.380	0.354	0.344	0.440	0.446	0.369	0.446
RE00	0.311	0.282	0.367	0.355	0.330	0.394	0.407	0.333	0.407

Table 17 – Maximum Accelerations of Major Elevations for Z-Dir. (PCCV)

			SRSS A	ccelerati	on Z-Dir	ection (g	)		
	270- 200	270- 500	560- 100	560- 200	560- 500	900- 100	900- 200	2032- 100	Envelope
CV11	0.702	0.654	0.672	0.666	0.645	1.458	0.958	1.495	1.495
CV10	0.644	0.595	0.621	0.611	0.589	1.319	0.903	1.367	1.367
CV09	0.526	0.479	0.522	0.515	0.483	1.041	0.791	1.062	1.062
CV08	0.460	0.414	0.480	0.456	0.426	0.893	0.726	0.906	0.906
CV07	0.437	0.391	0.466	0.434	0.405	0.841	0.701	0.849	0.849
CV06	0.398	0.356	0.441	0.401	0.375	0.754	0.658	0.754	0.754
CV05	0.365	0.326	0.418	0.375	0.350	0.675	0.616	0.665	0.675
CV04	0.342	0.304	0.399	0.355	0.331	0.616	0.583	0.600	0.616
CV03	0.330	0.292	0.391	0.355	0.323	0.583	0.565	0.564	0.583
CV02	0.317	0.286	0.372	0.356	0.324	0.508	0.523	0.484	0.523
CV01	0.315	0.285	0.368	0.356	0.328	0.439	0.462	0.391	0.462
CV00	0.312	0.282	0.367	0.355	0.330	0.394	0.407	0.333	0.407

Table 18 – Maximum Accelerations of Ma	jor Elevations for Z-Dir. (CIS
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	270- 200	270- 500	560- 100	560- 200	560- 500	900- 100	900- 200	2032- 100	Envelope
IC09	0.492	0.460	0.541	0.516	0.521	0.660	0.717	0.778	0.778
IC18	0.443	0.433	0.518	0.491	0.496	0.636	0.686	0.715	0.715
IC08	0.450	0.437	0.521	0.494	0.499	0.639	0.690	0.721	0.721
IC05	0.377	0.337	0.395	0.393	0.362	0.464	0.470	0.419	0.470
IC72	0.455	0.414	0.497	0.479	0.458	0.660	0.620	0.724	0.724
IC71	0.452	0.410	0.493	0.474	0.453	0.637	0.614	0.716	0.716
IC62	0.428	0.387	0.453	0.444	0.407	0.583	0.536	0.587	0.587
IC61	0.415	0.378	0.445	0.435	0.402	0.553	0.549	0.603	0.603
IC15	0.357	0.316	0.388	0.373	0.352	0.450	0.458	0.392	0.458
IC04	0.347	0.307	0.386	0.368	0.350	0.441	0.451	0.380	0.451
IC14	0.339	0.298	0.383	0.363	0.347	0.436	0.446	0.373	0.446
IC03	0.324	0.289	0.378	0.354	0.343	0.425	0.436	0.361	0.436
IC02	0.315	0.281	0.371	0.351	0.336	0.412	0.425	0.350	0.425
IC01	0.312	0.282	0.370	0.351	0.333	0.404	0.417	0.344	0.417
IC00	0.311	0.282	0.367	0.355	0.330	0.394	0.407	0.333	0.407

			SRSS Acceleration X-Direction (g)           270-         260-         560-         1900-         2032-								
Group ID	Max. Load	SDOF ID	270- 200	270- 500	560- 100	560- 200	560- 500	1900- 100	900- 200	2032- 100	Envelope
		W_N_1a	0.607	0.515	0.820	0.647	0.658	2.217	1.859	2.201	2.217
EH07v1	2 217	W_N_1b	0.597	0.516	0.793	0.640	0.658	2.112	1.772	2.109	2.112
11107 11	2.217	W_N_1c	0.606	0.522	0.798	0.628	0.654	2.081	1.738	2.077	2.081
		W_N_1d	0.629	0.533	0.824	0.660	0.609	1.908	1.604	1.892	1.908
		W_S_3	0.487	0.419	0.608	0.566	0.530	0.678	0.624	0.684	0.684
		W_S_4	0.491	0.419	0.599	0.562	0.527	0.683	0.626	0.675	0.683
	1 1 1 2	W_S_5	0.553	0.486	0.771	0.686	0.707	0.992	0.914	1.113	1.113
RE04X1	1.115	W_S_6	0.565	0.497	0.762	0.667	0.687	1.014	0.898	1.062	1.062
		W_P1n	0.503	0.419	0.590	0.561	0.529	0.681	0.625	0.682	0.682
		W_P2n	0.489	0.412	0.591	0.562	0.514	0.648	0.594	0.657	0.657
	0.620	W_S_9	0.439	0.395	0.528	0.505	0.474	0.616	0.541	0.599	0.616
REUSXI	0.029	W_S_10	0.439	0.395	0.530	0.504	0.476	0.629	0.558	0.591	0.629
DE02v1	0.579	W_N_3	0.424	0.381	0.510	0.468	0.454	0.578	0.497	0.528	0.578
REUZXI	0.578	W_N_2	0.426	0.386	0.521	0.475	0.467	0.551	0.482	0.521	0.551
		W S 21	0.415	0.357	0.472	0.427	0.420	0.389	0.414	0.378	0.472
	0 472	W_S_22	0.415	0.356	0.472	0.427	0.421	0.388	0.413	0.378	0.472
REUUXI	0.472	W_S_25	0.416	0.357	0.471	0.428	0.421	0.394	0.418	0.381	0.471
		W_S_26	0.415	0.357	0.472	0.428	0.421	0.388	0.413	0.380	0.472

## Table 19 – Out-of-Plane Maximum Accelerations on Walls Running E-W

					SRSS A	ccelerati	ion Y-Dir	ection (g	I)		
Group ID	Max. Load	SDOF ID	270- 200	270- 500	560- 100	560- 200	560- 500	900- 100	900- 200	2032- 100	Envelope
FH07Y1	2.472	W_E_1	0.640	0.524	0.945	0.812	0.901	2.472	2.151	2.112	2.472
	1 954	W_E_2	0.711	0.653	0.855	0.806	0.789	1.379	1.261	1.854	1.854
	1.004	W_E_3	0.527	0.468	0.656	0.541	0.541	0.724	0.727	0.746	0.746
RE41Y1	1.451	W_W_2	0.811	0.763	0.811	0.771	0.774	1.101	1.076	1.451	1.451
		W_E_7	0.533	0.483	0.665	0.573	0.545	0.797	0.820	0.685	0.820
		W_W_1	0.523	0.478	0.656	0.561	0.538	0.782	0.790	0.674	0.790
	0 880	W_P1e	0.532	0.482	0.658	0.612	0.587	0.855	0.880	0.842	0.880
	0.000	W_P1w	0.532	0.482	0.658	0.612	0.587	0.855	0.880	0.842	0.880
		W_P2e	0.539	0.487	0.660	0.622	0.591	0.859	0.880	0.846	0.880
		W_P2w	0.539	0.487	0.660	0.622	0.591	0.859	0.880	0.846	0.880
		W_E_4a	0.497	0.456	0.571	0.481	0.474	0.589	0.599	0.642	0.642
		W_E_4b	0.494	0.453	0.570	0.481	0.475	0.580	0.589	0.580	0.589
RE03Y1	0.649	W_E_5	0.496	0.458	0.568	0.483	0.480	0.617	0.608	0.638	0.638
		W_W_5	0.501	0.460	0.570	0.483	0.482	0.628	0.620	0.639	0.639
		W_W_6	0.502	0.458	0.572	0.483	0.476	0.601	0.611	0.649	0.649
		W_W_8	0.465	0.431	0.508	0.436	0.439	0.499	0.501	0.527	0.527
RE02Y1	0.600	W_E_6	0.464	0.432	0.510	0.435	0.440	0.495	0.499	0.519	0.519
		W_P3e	0.494	0.452	0.534	0.456	0.451	0.546	0.553	0.600	0.600
RE00Y1	0.467	W_E_8	0.457	0.396	0.390	0.352	0.328	0.467	0.438	0.373	0.467

## Table 20 – Out-of-Plane Maximum Accelerations on Walls Running N-S

			SRSS Acceleration Z-Direction (g)           270-         270-         560-         560-         900-         2032-           200         500         400         500         400         500									
Group ID	Max. Load	SDOF ID	270- 200	270- 500	560- 100	560- 200	560- 500	900- 100	900- 200	2032- 100	Envelope	
		115_10a	1.035	0.955	1.107	1.074	1.129	3.692	2.818	3.327	3.692	
		115_10b	0.916	0.843	0.984	0.944	0.996	3.225	2.554	2.941	3.225	
FH08Z1	3.692	115_10c	0.861	0.859	0.908	0.936	0.990	2.930	2.242	2.752	2.930	
		115_10d	0.947	0.908	1.010	0.955	1.012	2.917	2.020	2.804	2.917	
		115_10e	0.990	0.936	0.984	0.904	0.971	2.569	1.739	2.550	2.569	
		115_30	0.936	0.871	1.073	0.940	1.024	2.175	1.862	2.416	2.416	
DE0572	2 4 1 6	115_30a	0.992	0.923	1.029	1.015	1.032	2.009	1.831	2.380	2.380	
REUJZZ	2.410	115_30b	0.885	0.827	0.870	0.873	0.882	1.800	1.502	1.976	1.976	
		115_30c	0.813	0.753	0.881	0.831	0.857	1.771	1.609	2.063	2.063	
		115_31	0.658	0.641	0.780	0.723	0.728	1.244	1.210	1.355	1.355	
		115_32	0.749	0.715	0.884	0.825	0.827	1.425	1.424	1.575	1.575	
		115_33a	0.690	0.618	0.617	0.590	0.584	1.268	1.045	1.374	1.374	
RE05Z1	1.575	115_33b	0.776	0.701	0.678	0.652	0.670	1.366	1.070	1.562	1.562	
		115_33c	0.619	0.573	0.675	0.594	0.597	1.456	1.253	1.538	1.538	
		115_33d	0.626	0.580	0.658	0.608	0.603	1.475	1.276	1.571	1.571	
		115_40	0.700	0.678	0.811	0.765	0.767	1.242	1.235	1.378	1.378	
DE4171	2 205	101_10a	0.954	0.883	0.877	0.903	0.902	2.205	1.589	2.167	2.205	
	2.205	101_10b	0.783	0.693	0.698	0.697	0.712	1.334	1.106	1.433	1.433	

			SRSS Acceleration Z-Direction (g)								
Group ID	Max. Load	SDOF ID	270- 200	270- 500	560- 100	560- 200	560- 500	900- 100	900- 200	2032- 100	Envelope
		101_12b	0.679	0.581	0.689	0.692	0.683	1.613	1.295	1.676	1.676
RE41Z3	2.014	101_41b	0.787	0.709	0.780	0.788	0.783	1.906	1.476	1.999	1.999
		101_43a	0.801	0.714	0.754	0.778	0.761	1.900	1.497	2.014	2.014
		101_11	0.576	0.508	0.576	0.581	0.577	1.180	1.015	1.163	1.180
RE41Z2	1.180	101_40	0.496	0.474	0.549	0.552	0.542	1.061	0.950	0.982	1.061
		101_41a	0.524	0.505	0.626	0.615	0.609	1.070	0.945	1.037	1.070
		101_21	0.942	0.874	0.976	0.957	1.012	3.087	2.618	2.580	3.087
		101_22	0.995	0.913	0.795	0.858	0.833	1.299	1.225	1.881	1.881
RE42Z1	3.087	101_23	0.993	0.917	0.961	0.958	0.965	2.092	1.562	2.171	2.171
		101_23a	0.822	0.738	0.673	0.700	0.690	1.080	1.053	1.500	1.500
		101_24a	0.695	0.614	0.652	0.641	0.618	0.957	0.939	1.223	1.223
		101_30	0.568	0.522	0.639	0.641	0.602	0.955	0.942	1.174	1.174
RE04Z1	1.174	101_30a	0.526	0.493	0.611	0.606	0.575	0.942	0.929	1.011	1.011
		101_33a	0.586	0.523	0.674	0.633	0.625	1.095	1.052	1.141	1.141
		86_17b	0.697	0.613	0.604	0.578	0.571	0.991	0.800	1.226	1.226
RE03Z1	1.317	76_33b	0.600	0.575	0.703	0.652	0.648	1.301	1.104	1.303	1.303
		76_43b	0.594	0.577	0.704	0.646	0.646	1.274	1.066	1.317	1.317

				5	SRSS Ac	celeratio	on Z-Dire	ction (g)			
Group ID	Max. Load	SDOF ID	270- 200	270- 500	560- 100	560- 200	560- 500	900- 100	900- 200	2032- 100	Envelope
		86_14	0.562	0.513	0.599	0.564	0.548	0.800	0.775	0.903	0.903
		76_10b	0.566	0.516	0.601	0.565	0.549	0.805	0.777	0.907	0.907
RE03Z2	1.218	76_13	0.511	0.453	0.521	0.504	0.485	0.689	0.624	0.850	0.850
		76_21g	0.704	0.622	0.702	0.641	0.640	1.054	0.926	1.218	1.218
		76_43a	0.497	0.459	0.580	0.508	0.527	0.898	0.841	0.940	0.940
		86_16	0.465	0.423	0.534	0.515	0.476	0.714	0.674	0.756	0.756
DE0373	0.016	76_10c	0.451	0.412	0.522	0.502	0.467	0.712	0.671	0.747	0.747
RE03Z3	0.910	76_11a	0.533	0.484	0.616	0.562	0.548	0.882	0.853	0.916	0.916
		76_20a	0.453	0.435	0.563	0.525	0.503	0.737	0.715	0.779	0.779
		76_10a	0.494	0.443	0.554	0.522	0.497	0.718	0.713	0.724	0.724
		76_30a	0.445	0.413	0.539	0.505	0.484	0.746	0.721	0.694	0.746
		76_30b	0.421	0.396	0.524	0.488	0.471	0.735	0.712	0.647	0.735
DE0374	0.001	76_30c	0.420	0.395	0.523	0.485	0.470	0.734	0.710	0.649	0.734
NEUJZ4	0.901	76_31b	0.388	0.355	0.476	0.436	0.427	0.737	0.682	0.701	0.737
		76_33a	0.474	0.429	0.566	0.515	0.505	0.901	0.834	0.866	0.901
		76_40a	0.459	0.411	0.517	0.483	0.463	0.725	0.714	0.688	0.725
		76_41c	0.386	0.350	0.469	0.429	0.420	0.728	0.679	0.700	0.728

			SRSS Acceleration Z-Direction (g)           270-         270-         560-         560-         900-         2032-									
Group ID	Max. Load	SDOF ID	270- 200	270- 500	560- 100	560- 200	560- 500	900- 100	900- 200	2032- 100	Envelope	
		50_21b	0.625	0.551	0.623	0.598	0.586	0.919	0.843	1.059	1.059	
DE0271	1.059	50_21c	0.591	0.517	0.589	0.570	0.560	0.887	0.806	1.027	1.027	
INLUZZ I	1.059	50_21d	0.549	0.482	0.564	0.543	0.533	0.814	0.759	0.932	0.932	
		50_21e	0.528	0.472	0.549	0.527	0.519	0.815	0.747	0.922	0.922	
		50_20b	0.538	0.492	0.579	0.553	0.540	0.697	0.664	0.734	0.734	
DE0272	0.810	50_22a	0.454	0.410	0.496	0.476	0.455	0.622	0.582	0.623	0.623	
REUZZZ	0.019	50_33d	0.560	0.521	0.610	0.570	0.559	0.796	0.803	0.819	0.819	
		50_43d	0.542	0.500	0.558	0.531	0.502	0.769	0.741	0.794	0.794	
		50_30a	0.425	0.419	0.530	0.509	0.477	0.633	0.622	0.584	0.633	
RE02Z3	0.679	50_30b	0.459	0.452	0.560	0.541	0.503	0.679	0.669	0.658	0.679	
		50_40b	0.457	0.418	0.526	0.500	0.464	0.651	0.659	0.615	0.659	
		50_10b	0.434	0.393	0.489	0.462	0.443	0.644	0.627	0.563	0.644	
		50_32c	0.458	0.410	0.517	0.478	0.464	0.752	0.707	0.716	0.752	
DE0274	0.767	50_34	0.448	0.400	0.484	0.448	0.435	0.740	0.686	0.740	0.740	
NEUZZ4	0.707	50_42e	0.450	0.412	0.509	0.461	0.462	0.738	0.699	0.766	0.766	
		50_44	0.446	0.401	0.485	0.442	0.430	0.732	0.684	0.767	0.767	
		35 26	0.452	0.439	0.559	0.524	0.502	0.665	0.666	0.591	0.666	

Group ID	Max. Load	SDOF ID	270- 200	270- 500	560- 100	560- 200	560- 500	900- 100	900- 200	2032- 100	Envelope
		25_30b	0.436	0.413	0.497	0.487	0.447	0.499	0.508	0.490	0.508
RE01Z1	0.629	25_33b	0.452	0.422	0.500	0.491	0.454	0.516	0.536	0.587	0.587
		25_42d	0.529	0.497	0.556	0.558	0.502	0.580	0.595	0.629	0.629
		25_33d	0.457	0.409	0.466	0.448	0.440	0.634	0.594	0.663	0.663
DE0172	0.692	25_34b	0.434	0.405	0.511	0.476	0.464	0.625	0.613	0.600	0.625
REVIZZ	0.005	25_43d	0.473	0.432	0.489	0.475	0.463	0.650	0.616	0.683	0.683
		25_44b	0.445	0.414	0.520	0.484	0.475	0.634	0.626	0.611	0.634
		25_20b	0.440	0.415	0.482	0.466	0.457	0.655	0.639	0.622	0.655
DE0172	0.600	25_20d	0.479	0.451	0.509	0.498	0.488	0.685	0.668	0.649	0.685
REU123	0.090	25_20e	0.457	0.430	0.492	0.479	0.469	0.652	0.639	0.593	0.652
		25_20f	0.506	0.473	0.528	0.517	0.508	0.690	0.678	0.656	0.690
		25_20a	0.452	0.410	0.473	0.466	0.454	0.597	0.589	0.603	0.603
RE01Z4	0.763	13_31	0.601	0.559	0.611	0.603	0.583	0.664	0.690	0.763	0.763
		13_42	0.530	0.484	0.542	0.520	0.509	0.685	0.658	0.714	0.714
		25_20c	0.399	0.373	0.452	0.429	0.418	0.556	0.551	0.487	0.556
RE0175	0.601	25_23	0.406	0.387	0.476	0.458	0.432	0.524	0.529	0.444	0.529
INCO IZO	0.001	25_22e	0.405	0.380	0.463	0.437	0.424	0.545	0.547	0.472	0.547
		13_17	0.445	0.404	0.466	0.449	0.438	0.601	0.590	0.511	0.601

				9	SRSS Ac	celeratio	on Z-Dire	ction (g)			
Group ID	Max. Load	SDOF ID	270- 200	270- 500	560- 100	560- 200	560- 500	900- 100	900- 200	2032- 100	Envelope
<b>DE0071</b>	0.514	3_32a	0.471	0.434	0.471	0.464	0.446	0.465	0.467	0.514	0.514
INE OUZ I	0.514	3_32d	0.470	0.434	0.474	0.467	0.449	0.460	0.474	0.511	0.511
<b>PE0072</b>	0.545	3_32b	0.416	0.380	0.449	0.424	0.421	0.545	0.532	0.527	0.545
INL0022	0.545	3_32c	0.415	0.379	0.447	0.420	0.420	0.543	0.532	0.527	0.543
		3_10a	0.443	0.407	0.469	0.456	0.429	0.457	0.482	0.427	0.482
		3_20a	0.453	0.419	0.464	0.461	0.430	0.453	0.483	0.449	0.483
RE00Z3	0.483	3_15c	0.396	0.369	0.436	0.421	0.398	0.461	0.480	0.394	0.480
		3_15d	0.386	0.360	0.428	0.415	0.390	0.458	0.477	0.393	0.477
		3_15	0.394	0.368	0.425	0.418	0.389	0.457	0.479	0.398	0.479
		n8_10a	0.396	0.366	0.434	0.415	0.395	0.446	0.469	0.386	0.469
BS01Z1	0.495	n8_11c	0.458	0.427	0.482	0.468	0.437	0.465	0.495	0.408	0.495
		n8_16	0.398	0.371	0.436	0.429	0.394	0.460	0.479	0.402	0.479
		n8_13	0.468	0.433	0.488	0.472	0.453	0.479	0.505	0.431	0.505
		n8_14b	0.430	0.400	0.461	0.452	0.423	0.470	0.491	0.423	0.491
BS0172	0 505	n8_21c	0.449	0.413	0.462	0.459	0.426	0.460	0.489	0.440	0.489
000122	0.000	n8_22a	0.390	0.360	0.417	0.412	0.379	0.438	0.463	0.383	0.463
		n8_30a	0.390	0.360	0.413	0.405	0.374	0.400	0.419	0.388	0.419
		n8_40a	0.394	0.365	0.425	0.406	0.386	0.408	0.430	0.378	0.430

#### MUAP-10006(R0)

#### Soil-Structure Interaction Analyses and Results

#### for the US-APWR Standard Plant

		Eı	nvelope (a	ll units in kip a	ind feet)		9	Story Force	e
	Tns	Tew	Pv	Mns	Mew	Tor	Tns'	Tew'	Pv'
CV11	1,585	2,086	1,228	351	421	251	1,597	2,129	1,907
CV10	7,220	9,465	5,607	19,363	23,172	13,923	7,378	9,838	6,558
CV09	12,732	16,332	8,296	94,542	115,156	68,988	13,275	17,180	10,152
CV08	12,325	15,411	7,692	145,307	180,077	107,339	13,161	16,557	8,916
CV07	15,257	18,130	10,110	209,663	259,101	153,272	16,661	19,637	11,306
CV06	9,644	11,060	6,850	143,452	175,057	100,767	10,419	12,231	7,248
CV05	6,811	7,450	5,101	92,290	127,029	70,627	7,529	8,282	5,270
CV04	3,726	3,830	2,861	48,158	69,012	37,044	4,175	4,407	3,247
CV03	3,321	3,543	2,589	44,009	61,009	32,152	3,766	3,987	5,316
CV02	4,530	4,544	3,801	60,007	80,003	39,749	5,090	5,090	3,999
CV01	3,941	3,380	3,777	50,036	67,010	23,725	4,527	4,115	4,115

## Table 22 – Enveloped Forces for PCCV

\* Please note the story forces in this table are adjusted to reflect the contributions from moments along with the consideration of conservative margins.

		Eı	nvelope (a	ll units in kip a	and feet)		5	Story Force	e
	Tns	Tew	Pv	Mns	Mew	Tor	Tns'	Tew'	Pv'
IC09	2,809	2,090	558	1,999	2,253	506	2,864	2,112	1,360
IC18	4,070	3,894	1,491	9,664	8,671	1,778	4,160	4,056	3,536
IC08	636	628	249	782	932	519	650	650	547
IC05	8,834	12,661	7,521	135,295	157,823	435,371	12,079	16,609	10,569
IC72	1,112	1,066	585	6,966	3,320	12,875	2,002	1,797	1,185
IC71	1,515	1,532	753	8,102	4,141	16,693	2,496	2,184	1,508
IC62	4,001	4,043	1,453	16,055	10,679	6,497	4,212	4,212	2,808
IC61	3,160	3,069	1,130	4,819	7,108	3,554	3,300	3,190	2,200
IC15	110	120	101	1,443	1,602	877	1,265	264	132
IC04	7,188	7,211	6,710	76,499	66,395	34,398	8,195	8,195	8,195
IC14	1,170	917	170	1,227	1,011	9,318	1,253	1,094	177
IC03	6,217	6,421	5,538	28,845	23,043	20,006	6,631	7,073	5,747
IC02	8,676	7,910	11,101	134,843	108,045	140,944	10,440	10,440	11,310
IC01	8,902	8,350	7,716	95,218	54,001	103,965	10,175	10,175	9,250

## Table 23 – Enveloped Forces for CIS

\* Please note the story forces in this table are adjusted to reflect the contributions from moments along with the consideration of conservative margins.

		Eı	nvelope (a	ll units in kip a	and feet)		5	Story Force	9
	Tns	Tew	Pv	Mns	Mew	Tor	Tns'	Tew'	Pv'
FH08	15,786	9,225	8,229	42,555	156,544	44,763	16,219	10,261	9,599
FH07	8,934	5,679	4,040	37,025	75,378	34,438	9,291	6,357	7,091
RE05	14,303	17,484	17,730	227,488	630,620	223,415	15,939	18,596	18,216
FH06	3,510	3,618	3,613	17,478	82,512	43,165	3,978	4,680	4,446
RE41	12,218	7,380	9,413	252,740	185,099	257,406	15,120	10,395	9,923
RE42	6,642	4,422	6,044	272,135	70,261	246,526	9,867	5,693	6,452
RE04	8,477	15,550	14,152	33,859	455,949	81,737	9,960	16,600	14,940
RE03	35,046	39,886	37,930	5,355,388	2,006,693	2,421,894	50,775	50,775	44,005
RE02	37,344	36,992	34,920	1,960,274	1,205,411	315,053	39,820	43,440	39,820
RE01	33,003	30,301	30,164	860,557	705,391	777,629	37,730	37,730	34,300

## Table 24 – Enveloped Forces for R/B and FH/A

\* Please note the story forces in this table are adjusted to reflect the contributions from moments along with the consideration of conservative margins.

	SRSS Acceleration NS Direction (g)								
	270- 200	270- 500	560- 100	560- 200	560- 500	900- 100	900- 200	2032- 100	Envelope
Roof Elev. 39'-6"	0.683	0.601	0.868	0.634	0.759	0.981	0.965	0.922	0.981
Ground Floor Elev. 3'-7"	0.509	0.488	0.445	0.439	0.431	0.573	0.582	0.580	0.582
Basemat Elev. 26'-4"	0.407	0.396	0.369	0.363	0.358	0.365	0.347	0.332	0.407

Table 25 – Maximum Accelerations for PS/B X-Dir.

Table 26 – Maximum Accelerations for PS/B Y-Dir.

	SRSS Acceleration EW Direction (g)								
	270- 200	270- 500	560- 100	560- 200	560- 500	900- 100	900- 200	2032- 100	Envelope
Roof Elev. 39'-6"	0.553	0.532	0.690	0.545	0.619	0.931	0.852	0.848	0.931
Ground Floor Elev. 3'-7"	0.434	0.414	0.487	0.428	0.451	0.507	0.528	0.461	0.528
Basemat Elev. 26'-4''	0.357	0.350	0.380	0.345	0.356	0.348	0.366	0.330	0.380

Table 27 – Maximum Accelerations for PS/B Z-Dir.

	SRSS Acceleration Vertical Direction (g)								
	270- 200	270- 500	560- 100	560- 200	560- 500	900- 100	900- 200	2032- 100	Envelope
Roof Elev. 39'-6"	0.481	0.465	0.519	0.474	0.489	0.710	0.653	0.682	0.710
Ground Floor Elev. 3'-7"	0.408	0.391	0.416	0.387	0.387	0.396	0.395	0.397	0.416
Basemat Elev. 26'-4"	0.380	0.365	0.381	0.361	0.358	0.330	0.335	0.312	0.381

Location			270-200		270-500 SRSS				
			SRSS						
Symbol	Node No.	NS (x) Disp (in)	EW (y) Disp (in)	Vert. (z) Disp (in)	NS (x) Disp (in)	EW (y) Disp (in)	Vert. (z) Disp (in)		
BM08	495	0.128	0.112	0.106	0.131	0.104	0.102		
BM09	507	0.128	0.112	0.106	0.131	0.104	0.102		
BM10	729	0.118	0.110	0.099	0.121	0.103	0.095		
BM11	741	0.123	0.107	0.107	0.126	0.105	0.103		
SF00	1296	0.231	0.162	0.118	0.228	0.159	0.113		
SF01	1308	0.231	0.165	0.119	0.228	0.162	0.114		
SF02	1530	0.231	0.165	0.119	0.228	0.162	0.114		
SF03	1542	0.230	0.165	0.121	0.226	0.163	0.116		
SF20	1918	0.370	0.230	0.125	0.353	0.228	0.119		
SF23	2158	0.370	0.233	0.126	0.357	0.231	0.120		
SF26	2263	0.393	0.243	0.128	0.373	0.241	0.121		
SF27	2379	0.407	0.249	0.126	0.391	0.246	0.120		

Table 28 – Maximum Displacements for PS/B (270 Cases)

Table 29 – Maximum Displacements for PS/B (560 Cases)

Location			560-100			560-200		560-500			
			SRSS			SRSS		SRSS			
Symbol	Node No.	NS (x) Disp (in)	EW (y) Disp (in)	Vert. (z) Disp (in)	NS (x) Disp (in)	EW (y) Disp (in)	Vert. (z) Disp (in)	NS (x) Disp (in)	EW (y) Disp (in)	Vert. (z) Disp (in)	
BM08	495	0.069	0.065	0.063	0.074	0.066	0.064	0.062	0.057	0.058	
BM09	507	0.069	0.065	0.063	0.074	0.066	0.064	0.062	0.057	0.058	
BM10	729	0.065	0.064	0.056	0.068	0.065	0.058	0.056	0.057	0.052	
BM11	741	0.070	0.066	0.065	0.072	0.066	0.065	0.060	0.058	0.060	
SF00	1296	0.147	0.106	0.076	0.137	0.106	0.074	0.127	0.097	0.069	
SF01	1308	0.147	0.109	0.077	0.137	0.109	0.075	0.126	0.099	0.070	
SF02	1530	0.147	0.109	0.077	0.137	0.109	0.075	0.126	0.099	0.070	
SF03	1542	0.152	0.110	0.080	0.137	0.109	0.078	0.131	0.100	0.073	
SF20	1918	0.255	0.159	0.083	0.219	0.155	0.081	0.223	0.144	0.076	
SF23	2158	0.268	0.162	0.086	0.225	0.157	0.082	0.234	0.146	0.078	
SF26	2263	0.272	0.171	0.086	0.233	0.165	0.083	0.238	0.153	0.079	
SF27	2379	0.298	0.174	0.086	0.249	0.168	0.083	0.261	0.156	0.078	
Location		900-100			900-200						
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LUCA			SRSS			SRSS					
Symbol	Node No.	NS (x) Disp (in)	EW (y) Disp (in)	Vert. (z) Disp (in)	NS (x) Disp (in)	EW (y) Disp (in)	Vert. (z) Disp (in)				
BM08	495	0.100	0.081	0.018	0.101	0.084	0.019				
BM09	507	0.100	0.081	0.018	0.101	0.084	0.019				
BM10	729	0.099	0.080	0.014	0.100	0.083	0.015				
BM11	741	0.100	0.081	0.020	0.101	0.084	0.021				
SF00	1296	0.117	0.110	0.031	0.121	0.115	0.032				
SF01	1308	0.117	0.113	0.032	0.121	0.117	0.032				
SF02	1530	0.117	0.113	0.032	0.121	0.117	0.032				
SF03	1542	0.123	0.114	0.036	0.127	0.118	0.037				
SF20	1918	0.148	0.149	0.039	0.152	0.154	0.039				
SF23	2158	0.159	0.152	0.042	0.164	0.157	0.042				
SF26	2263	0.152	0.158	0.042	0.157	0.163	0.041				
SF27	2379	0.168	0.159	0.044	0.181	0.164	0.044				

Table 30 – Maximum Displacements for PS/B (900 Cases)

### Table 31 – Maximum Displacements for PS/B (2032-100)

Loca	ation	2032-100				
LUCE		SRSS				
Symbol	Node No.	NS (x) Disp (in)	EW (y) Disp (in)	Vert. (z) Disp (in)		
BM08	495	0.099	0.074	0.010		
BM09	507	0.099	0.074	0.010		
BM10	729	0.099	0.073	0.008		
BM11	741	0.100	0.074	0.011		
SF00	1296	0.107	0.101	0.022		
SF01	1308	0.107	0.103	0.022		
SF02	1530	0.107	0.103	0.022		
SF03	1542	0.111	0.104	0.026		
SF20	1918	0.127	0.137	0.029		
SF23	2158	0.136	0.139	0.031		
SF26	2263	0.130	0.145	0.031		
SF27	2379	0.142	0.146	0.033		

# Appendix H

## Maximum Acceleration Bubble Plots for PS/B

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\*Note: All seismic demands are in units of (g). They are combined ZPA's (Zero Period Accelerations) for three direction earthquake excitations using SRSS rule and envelop of all soil profiles. Refer to Section 3.6.2 of this report for the methodology / procedure to develop the seismic demands (ZPA's).



Figure 1 – Top of Basemat – Seismic Demand Bubble Plot SRSS N-S Direction – Elev. -26'-4"



Figure 2 – Ground – Seismic Demand Bubble Plot SRSS N-S Direction – Elev. 3'-7"



Figure 3 – Roof – Seismic Demand Bubble Plot SRSS N-S Direction – Elev. 39'-6"



Figure 4 – Top of Basemat – Seismic Demand Bubble Plot SRSS E-W Direction – Elev. -26'-4"



Figure 5 – Ground – Seismic Demand Bubble Plot SRSS E-W Direction – Elev. 3'-7"



Figure 6 – Roof – Seismic Demand Bubble Plot SRSS E-W Direction – Elev. 39'-6"



Figure 7 – Top of Basemat – Seismic Demand Bubble Plot SRSS Vertical Direction – Elev. -26'-4"



Figure 8 – Ground – Seismic Demand Bubble Plot SRSS Vertical Direction – Elev. 3'-7"



Figure 9 – Roof – Seismic Demand Bubble Plot SRSS Vertical Direction – Elev. 39'-6"

#### for the US-APWR Standard Plant



Figure 10 – Wall – Seismic Demand Bubble Plot SRSS Vertical Direction – Column Line AP

#### for the US-APWR Standard Plant



Figure 11 – Wall – Seismic Demand Bubble Plot SRSS Vertical Direction – Column Line AP