
CHAPTER 3—DESIGN OF STRUCTURES, SYSTEMS, COMPONENTS, AND EQUIPMENT

LIST OF FIGURES

Figure 3.6.2-1—Representative Mathematical Model of a Piping System and its Restraints	3.6-43
Figure 3.6.3-1—Plain View of U.S. EPR RCS Primary Piping.....	3.6-105
Figure 3.6.3-2—Elevation View of U.S. EPR RCS Primary Piping	3.6-106
Figure 3.6.3-3—Plan, Elevation, and Isometric View of the U.S. EPR Surge Line.....	3.6-107
Figure 3.6.3-4—Isometric View of the Main Steam Line.....	3.6-108
Figure 3.6.3-5—Minimum Moment versus Circumferential Crack Leakage Sizes for 5 gpm at Various Main Coolant Loop Locations.....	3.6-109
Figure 3.6.3-6—Minimum Moment versus Circumferential Crack Leakage Sizes for 5 gpm at Two Surge Line Locations	3.6-110
Figure 3.6.3-7—Pressure Only Leakage Rate versus Crack Length for Both Axial and Circumferential Crack Morphologies	3.6-111
Figure 3.6.3-8—Minimum Moment versus Circumferential Crack Leakage Sizes for 1 gpm in Main Steam Line Piping	3.6-112
Figure 3.6.3-9—Schematics of Analyzed Crack Geometries Considered for Straight Pipe Section.....	3.6-113
Figure 3.6.3-10—Schematic of J-Tearing Instability Diagram	3.6-114
Figure 3.6.3-11—Typical Allowable Load Limit (ALL) Diagram Considering Various Axial Loadings	3.6-115
Figure 3.6.3-12—ALL for Reactor Vessel Outlet Nozzle at Alloy 52 Weld	3.6-116
Figure 3.6.3-13—ALL for Steam Generator Inlet Nozzle at Alloy 52 Weld	3.6-117
Figure 3.6.3-14—ALL for Steam Generator Outlet Nozzle at Alloy 52 Weld	3.6-118
Figure 3.6.3-15—ALL for CASS RC Pump Outlet Nozzle, Cold Leg Pipe, and RPV Inlet Nozzle	3.6-119
Figure 3.6.3-16—ALL for CASS RC Pump Inlet Nozzle	3.6-120
Figure 3.6.3-17—ALL for Hot Leg and Crossover Leg Piping	3.6-121
Figure 3.6.3-18—ALL for Pressurizer Surge Nozzle at Alloy 52 Weld.....	3.6-122
Figure 3.6.3-19—ALL for Surge Line Piping	3.6-123

Figure 3.6.3-20—ALL for Hot Leg Nozzle.....	3.6-124
Figure 3.6.3-21—Comparison of Base and Weld Metal ALL in Main Steam Line Piping	3.6-125
Figure 3.6.3-22—ALL for Main Steam Line Piping with Safety Factor of 2 on Flaw Size (Base Metal)	3.6-126
Figure 3.6.3-23—ALL for Main Steam Line Piping with Safety Factor of 1.7 on Flaw Size (Base Metal)	3.6-127
Figure 3.7.1-1—Design Response Spectra for EUR Control Motions (hard, medium and soft sites).....	3.7-23
Figure 3.7.1-2—Comparison of CSDRS to RG 1.60 and the Minimum Required Spectrum, Horizontal Motion.....	3.7-24
Figure 3.7.1-3—Comparison of CSDRS to RG 1.60, Vertical Motion.....	3.7-25
Figure 3.7.1-4—EUR Design Ground Spectra for Hard Conditions Normalized to 0.3g.....	3.7-26
Figure 3.7.1-5—EUR Design Ground Spectra for Medium Conditions Normalized to 0.3g.....	3.7-27
Figure 3.7.1-6—EUR Design Ground Spectra for Soft Conditions Normalized to 0.3g.....	3.7-28
Figure 3.7.1-7—Synthetic Acceleration Time Histories for EUR Hard CSDRS	3.7-29
Figure 3.7.1-8—Synthetic Velocity Time Histories for EUR Hard CSDRS	3.7-30
Figure 3.7.1-9—Synthetic Displacement Time Histories for EUR Hard CSDRS	3.7-31
Figure 3.7.1-10—Synthetic Acceleration Time Histories for EUR Medium CSDRS	3.7-32
Figure 3.7.1-11—Synthetic Velocity Time Histories for EUR Medium CSDRS	3.7-33
Figure 3.7.1-12—Synthetic Displacement Time Histories for EUR Medium CSDRS	3.7-34
Figure 3.7.1-13—Synthetic Acceleration Time Histories for EUR Soft CSDRS.....	3.7-35
Figure 3.7.1-14—Synthetic Velocity Time Histories for EUR Soft CSDRS.....	3.7-36
Figure 3.7.1-15—Synthetic Displacement Time Histories for EUR Soft CSDRS....	3.7-37
Figure 3.7.1-16—Damping Values for Cable Trays with Flexible Support Systems	3.7-38
Figure 3.7.1-17—Response Spectrum of Time History H1 vs. Target Spectrum EUR Hard Motion EUR Hard Spectra, TH1 vs. Target, 1.30*Target, 0.90*Target, 5% Damping	3.7-39
Figure 3.7.1-18—Response Spectrum of Time History H2 vs. Target Spectrum EUR Hard Motion EUR Hard Spectra, TH2 Vs. Target, 1.30*Target, 0.90*Target, 5% Damping	3.7-40

Figure 3.7.1-19—Response Spectrum of Time History H3 (Vertical) vs. Target Spectrum EUR Hard Motion EUR Hard Spectra, TH3 vs. Target, 1.30*Target, 0.90*Target, 5% Damping	3.7-41
Figure 3.7.1-20—Response Spectrum of Time History H1 vs. Target Spectrum EUR Medium Motion EUR Medium Spectra, TH1 vs. Target, 1.30*Target, 0.90*Target, 5% Damping	3.7-42
Figure 3.7.1-21—Response Spectrum of Time History H2 vs. Target Spectrum EUR Medium Motion EUR Medium Spectra, TH2 vs. Target, 1.30*Target, 0.90*Target, 5% Damping	3.7-43
Figure 3.7.1-22—Response Spectrum of Time History H3 (Vertical) vs. Target Spectrum EUR Medium Motion EUR Medium Spectra, TH3 vs. Target, 1.30*Target, 0.90*Target, 5% Damping	3.7-44
Figure 3.7.1-23—Response Spectrum of Time History H1 vs. Target Spectrum EUR Soft Motion EUR Soft Spectra, TH1 vs. Target, 1.30*Target, 0.90*Target, 5% Damping	3.7-45
Figure 3.7.1-24—Response Spectrum of Time History H2 vs. Target Spectrum EUR Soft Motion EUR Soft Spectra, TH2 vs. Target, 1.30*Target, 0.90*Target, 5% Damping	3.7-46
Figure 3.7.1-25—Response Spectrum of Time History H3 (Vertical) vs. Target Spectrum EUR Soft Motion EUR Soft Spectra, TH3 vs. Target, 1.30*Target, 0.90*Target, 5% Damping	3.7-47
Figure 3.7.1-26—Cumulative Energy Ratio Plot for Time History H1, H2, and H3 for EUR Hard Motion	3.7-48
Figure 3.7.1-27—Cumulative Energy Ratio Plot for Time History H1, H2, and H3 for EUR Medium Motion	3.7-49
Figure 3.7.1-28—Cumulative Energy Ratio Plot for Time History H1, H2, and H3 for EUR Soft Motion.....	3.7-50
Figure 3.7.1-29—Idealized Control Motion for Seismic Input to NI Common Basemat	3.7-51
Figure 3.7.1-30—CSDRS Definition for Seismic Reconciliation of CSDRS and GMRS	3.7-52
Figure 3.7.1-31—U.S. EPR Standard Plant Generic Soil Profiles - Shear Wave Velocity for SSI Analysis Cases	3.7-53
Figure 3.7.1-32—U.S. EPR Standard Plant Generic Soil Profiles - Shear Wave Velocity for SSI Analysis Cases	3.7-54
Figure 3.7.1-33—Input Motion for Structures not on the Nuclear Island Common Basemat, Horizontal Motion 5% Damping	3.7-55
Figure 3.7.1-34—Input Motion for Structures not on the Nuclear Island Common Basemat, Vertical Motion 5% Damping	3.7-56

Figure 3.7.1-35—Synthetic Acceleration, Velocity, and Displacement Time Histories for Structures not on the Nuclear Island Common Basemat, Horizontal (SSSI1) Motion	3.7-57
Figure 3.7.1-36—Synthetic Acceleration, Velocity, and Displacement Time Histories for Structures not on the Nuclear Island Common Basemat, Horizontal (SSSI2) Motion	3.7-58
Figure 3.7.1-37—Synthetic Acceleration, Velocity, and Displacement Time Histories for Structures not on the Nuclear Island Common Basemat, Vertical (SSSI3) Motion	3.7-59
Figure 3.7.1-38—Time History Response Spectrum vs. Input Spectrum for Structures not on the Nuclear Island Common Basemat, Horizontal (SSSI1) Component.....	3.7-60
Figure 3.7.1-39—Time History Response Spectrum vs. Input Spectrum for Structures not on the Nuclear Island Common Basemat, Horizontal (SSSI2) Component.....	3.7-61
Figure 3.7.1-40—Time History Response Spectrum vs. Input Spectrum for Structures not on the Nuclear Island Common Basemat, Vertical (SSSI3) Component.....	3.7-62
Figure 3.7.1-41—Cumulative Energy Plot for Time Histories for Structures not on the Nuclear Island Common Basemat	3.7-63
Figure 3.7.2-1—Decoupling of the Nuclear Island Common Basemat Interior Structures from the Outer Shield Walls.....	3.7-183
Figure 3.7.2-2—Plan View of Schematic Stick Model for Nuclear Island Common Basemat Structures	3.7-184
Figure 3.7.2-3—Schematic Elevation View of Stick Model for Nuclear Island Common Basemat Structures in Global Y-Z Plane	3.7-185
Figure 3.7.2-4—Schematic Elevation View of Stick Model for Nuclear Island Common Basemat Structures in Global X-Z Plane	3.7-186
Figure 3.7.2-5—3D Finite Element Model of Balance of NI Common Basemat Structures Perspective View.....	3.7-187
Figure 3.7.2-6—3D Finite Element Model of Balance of NI Common Basemat Structures Cutoff View on Y-Z Plane	3.7-188
Figure 3.7.2-7—3D Finite Element Model of Balance of NI Common Basemat Structures Cutoff View on X-Z Plane	3.7-189
Figure 3.7.2-8—3D Finite Element Model of Reactor Containment Building.....	3.7-190
Figure 3.7.2-9—3D Finite Element Model of Reactor Building Internal Structures.....	3.7-191
Figure 3.7.2-10—Stick Model STICK-2T for Balance of NI Common Basemat Structures - Plan View	3.7-192

Figure 3.7.2-11—Stick Model STICK-2T for Balance of NI Common Basemat Structures - Perspective View.....	3.7-193
Figure 3.7.2-12—Stick Model STICK-3T for Reactor Containment - Perspective View	3.7-194
Figure 3.7.2-13—Stick Model STICK-1T for Reactor Building Internal Structure - Perspective View.....	3.7-195
Figure 3.7.2-14—Stick vs. FEM Spectrum Comparison at Elev. +200ft, 5 inches (+61.09m) (Dome Apex) of Reactor Shield Building, 5% Damping, X-Direction.....	3.7-196
Figure 3.7.2-15—Stick vs. FEM Spectrum Comparison at Elev. +200ft, 5 inches (+61.09m) (Dome Apex) of Reactor Shield Building, 5% Damping, Y-Direction.....	3.7-197
Figure 3.7.2-16—Stick vs. FEM Spectrum Comparison at Elev. +200ft, 5 inches (+61.09m) (Dome Apex) of Reactor Shield Building, 5% Damping, Z-Direction	3.7-198
Figure 3.7.2-17—Stick vs. FEM Spectrum Comparison at Elev. +95 ft, 1-3/4 inches (+29.00m) - Safeguard Building 1, 5% Damping, X-Direction.....	3.7-199
Figure 3.7.2-18—Stick vs. FEM Spectrum Comparison at Elev. +95 ft, 1-3/4 inches (+29.00m) - Safeguard Building 1, 5% Damping, Y-Direction.....	3.7-200
Figure 3.7.2-19—Stick vs. FEM Spectrum Comparison at Elev. +95 ft, 1-3/4 inches (+29.00m) - Safeguard Building 1, 5% Damping, Z-Direction.....	3.7-201
Figure 3.7.2-20—Stick vs. FEM Spectrum Comparison at Elev. +26 ft, 3 inches (+8.00m) - Safeguard Building 1, 5% Damping, X-Direction.....	3.7-202
Figure 3.7.2-21—Stick vs. FEM Spectrum Comparison at Elev. +26 ft, 3 inches (+8.00m) - Safeguard Building 1, 5% Damping, Y-Direction.....	3.7-203
Figure 3.7.2-22—Stick vs. FEM Spectrum Comparison at Elev. +26 ft, 3 inches (+8.00m) - Safeguard Building 1, 5% Damping, Z-Direction	3.7-204
Figure 3.7.2-23—Stick vs. FEM Spectrum Comparison at Elev. +95 ft, 1-3/4 inches (+29.00m) - Safeguard Building 4, 5% Damping, X-Direction.....	3.7-205
Figure 3.7.2-24—Stick vs. FEM Spectrum Comparison at Elev. +95 ft, 1-3/4 inches (+29.00m) - Safeguard Building 4, 5% Damping, Y-Direction.....	3.7-206

Figure 3.7.2-25—Stick vs. FEM Spectrum Comparison at Elev. +95 ft, 1-3/4 inches (+29.00m) - Safeguard Building 4, 5% Damping, Z-Direction.....	3.7-207
Figure 3.7.2-26—Stick vs. FEM Spectrum Comparison at Elev. +26 ft, 3 inches (+8.00m) - Safeguard Building 4, 5% Damping, X-Direction.....	3.7-208
Figure 3.7.2-27—Stick vs. FEM Spectrum Comparison at Elev. +26 ft, 3 inches (+8.00m) - Safeguard Building 4, 5% Damping, Y-Direction.....	3.7-209
Figure 3.7.2-28—Stick vs. FEM Spectrum Comparison at Elev. +26 ft, 3 inches (+8.00m) - Safeguard Building 4, 5% Damping, Z-Direction.....	3.7-210
Figure 3.7.2-29—Stick vs. FEM Spectrum Comparison at Elev. +68 ft, 10-3/4 inches (+21.00m) - Safeguard Building 2/3, 5% Damping, X-Direction.....	3.7-211
Figure 3.7.2-30—Stick vs. FEM Spectrum Comparison at Elev. +68 ft, 10-3/4 inches (+21.00m) - Safeguard Building 2/3, 5% Damping, Y-Direction.....	3.7-212
Figure 3.7.2-31—Stick vs. FEM Spectrum Comparison at Elev. +68 ft, 10-3/4 inches (+21.00m) - Safeguard Building 2/3, 5% Damping, Z-Direction	3.7-213
Figure 3.7.2-32—Stick vs. FEM Spectrum Comparison at Elev. +26 ft, 3 inches (+8.00m) - Safeguard Building 2/3, 5% Damping, X-Direction.....	3.7-214
Figure 3.7.2-33—Stick vs. FEM Spectrum Comparison at Elev. +26 ft, 3 inches (+8.00m) - Safeguard Building 2/3, 5% Damping, Y-Direction.....	3.7-215
Figure 3.7.2-34—Stick vs. FEM Spectrum Comparison at Elev. +26 ft, 3 inches (+8.00m) - Safeguard Building 2/3, 5% Damping, Z-Direction	3.7-216
Figure 3.7.2-35—Stick vs. FEM Spectrum Comparison at Elev. +62 ft, 4-1/4 inches (+19.00m) - Fuel Building, 5% Damping, X-Direction.....	3.7-217
Figure 3.7.2-36—Stick vs. FEM Spectrum Comparison at Elev. +62 ft, 4-1/4 inches (+19.00m) - Fuel Building, 5% Damping, Y-Direction.....	3.7-218
Figure 3.7.2-37—Stick vs. FEM Spectrum Comparison at Elev. +62 ft, 4-1/4 inches (+19.00m) - Fuel Building, 5% Damping, Z-Direction	3.7-219

- Figure 3.7.2-38—Stick vs. FEM Spectrum Comparison at Elev.
+23 ft, 7-1/2 inches (+7.20m) - Fuel Building,
5% Damping, X-Direction..... 3.7-220
- Figure 3.7.2-39—Stick vs. FEM Spectrum Comparison at Elev.
+23 ft, 7-1/2 inches (+7.20m) - Fuel Building,
5% Damping, Y-Direction..... 3.7-221
- Figure 3.7.2-40—Stick vs. FEM Spectrum Comparison at Elev.
+23 ft, 7-1/2 inches (+7.20m) - Fuel Building,
5% Damping, Z-Direction 3.7-222
- Figure 3.7.2-41—Stick vs. FEM Spectrum Comparison at Elev.
+190 ft, 3-1/2 inches (+58.00m) - Containment Dome
Apex (Without Polar Crane), 5% Damping, X-Direction..... 3.7-223
- Figure 3.7.2-42—Stick vs. FEM Spectrum Comparison at Elev.
+190 ft, 3-1/2 inches (+58.00m) - Containment Dome Apex
(Without Polar Crane), 5% Damping, Y-Direction..... 3.7-224
- Figure 3.7.2-43—Stick vs. FEM Spectrum Comparison at Elev.
+190 ft, 3-1/2 inches (+58.00m) - Containment Dome Apex
(Without Polar Crane), 5% Damping, Z-Direction 3.7-225
- Figure 3.7.2-44—Stick vs. FEM Spectrum Comparison at Elev.
+123 ft, 4-1/4 inches (+37.60m) - Containment Building
(Without Polar Crane), 5% Damping, X-Direction 3.7-226
- Figure 3.7.2-45—Stick vs. FEM Spectrum Comparison at Elev.
+123 ft, 4-1/4 inches (+37.60m) - Containment Building
(Without Polar Crane), 5% Damping, Y-Direction..... 3.7-227
- Figure 3.7.2-46—Stick vs. FEM Spectrum Comparison at Elev.
+123 ft, 4-1/4 inches (+37.60m) - Containment Building
(Without Polar Crane), 5% Damping, Z-Direction 3.7-228
- Figure 3.7.2-47—Spectrum Comparison at Elev. +123 ft, 4-1/4 inches (+37.60m)
- Containment Building (Rigid vs. Flexible Polar Crane),
5% Damping, X-Direction..... 3.7-229
- Figure 3.7.2-48—Spectrum Comparison at Elev. +123 ft, 4-1/4 inches (+37.60m)
- Containment Building (Rigid vs. Flexible Polar Crane),
5% Damping, Y-Direction..... 3.7-230
- Figure 3.7.2-49—Spectrum Comparison at Elev. +123 ft, 4-1/4 inches (+37.60m)
- Containment Building (Rigid vs. Flexible Polar Crane),
5% Damping, Z-Direction 3.7-231
- Figure 3.7.2-50—Spectrum Comparison at Elev. +63 ft, 11-3/4 inches (+19.50m)
- Reactor Building Internal Structure, 4% Damping, X-Direction 3.7-232
- Figure 3.7.2-51—Spectrum Comparison at Elev. +63 ft, 11-3/4 inches (+19.50m)
- Reactor Building Internal Structure, 4% Damping, Y-Direction 3.7-233

Figure 3.7.2-52—Spectrum Comparison at Elev. +63 ft, 11-3/4 inches (+19.50m) - Reactor Building Internal Structure, 4% Damping, Z-Direction	3.7-234
Figure 3.7.2-53—Spectrum Comparison at Elev. +16 ft, 10-3/4 inches (+5.15m) - Reactor Building Internal Structure, 4% Damping, X-Direction	3.7-235
Figure 3.7.2-54—Spectrum Comparison at Elev. +16 ft, 10-3/4 inches (+5.15m) - Reactor Building Internal Structure, 4% Damping, Y-Direction	3.7-236
Figure 3.7.2-55—Spectrum Comparison at Elev. +16 ft, 10-3/4 inches (+5.15m) - Reactor Building Internal Structure, 4% Damping, Z-Direction	3.7-237
Figure 3.7.2-56—Simplified Stick Model of Reactor Coolant Loop.....	3.7-238
Figure 3.7.2-57—Isometric View of GTSTRUDL FEM for Emergency Power Generating Building.....	3.7-239
Figure 3.7.2-58—Section View of GTSTRUDL FEM for Emergency Power Generating Building.....	3.7-240
Figure 3.7.2-59—Isometric View of GTSTRUDL FEM for Emergency Service Water Building	3.7-241
Figure 3.7.2-60—Section View of GTSTRUDL FEM for Emergency Service Water Building	3.7-242
Figure 3.7.2-61—Plan View of NI Common Basemat Structures and Stick Model.....	3.7-243
Figure 3.7.2-62—Plan View of SSI Model for NI Common Basemat Structures and NAB	3.7-244
Figure 3.7.2-63—Elevation View of SSI Model for NI Common Basemat Structures and NAB in X-Z Plane.....	3.7-245
Figure 3.7.2-64—Schematic Footprint Area of NI Common Basemat	3.7-246
Figure 3.7.2-65—RCS Stick Coupled to Model STICK-1T for Reactor Building Internal Structure.....	3.7-247
Figure 3.7.2-66—Elevation View of NAB Stick Model in X-Z Plane.....	3.7-248
Figure 3.7.2-67—Elevation View of NAB Stick Model in Y-Z Plane.....	3.7-249
Figure 3.7.2-68—Response Spectra at NI Common Basemat Bottom Node 417 - 5% Damping X-Direction	3.7-250
Figure 3.7.2-69—Response Spectra at NI Common Basemat Bottom Node 417 - 5% Damping Y-Direction	3.7-251
Figure 3.7.2-70—Response Spectra at NI Common Basemat Bottom Node 417 - 5% Damping Z-Direction	3.7-252
Figure 3.7.2-71—Soil Model Surface Response Spectra at Centers of Footprints of EPGB and ESWB - 5% Damping X-Direction	3.7-253

Figure 3.7.2-72—Soil Model Surface Response Spectra at Centers of Footprints of EPGB and ESWB - 5% Damping Y-Direction	3.7-254
Figure 3.7.2-73—Soil Model Surface Response Spectra at Centers of Footprints of EPGB and ESWB - 5% Damping Z-Direction	3.7-255
Figure 3.7.2-74—Spectrum Envelope of Reactor Building Internal Structure - Elev. +16 ft, 10-3/4 inches (+5.15m) 2%, 3%, 4%, 5%, 7% and 10% Damping X-Direction	3.7-256
Figure 3.7.2-75—Spectrum Envelope of Reactor Building Internal Structure - Elev. +16 ft, 10-3/4 inches (+5.15m) 2%, 3%, 4%, 5%, 7% and 10% Damping Y-Direction	3.7-257
Figure 3.7.2-76—Spectrum Envelope of Reactor Building Internal Structure - Elev. +16 ft, 10-3/4 inches (+5.15m) 2%, 3%, 4%, 5%, 7% and 10% Damping Z-Direction	3.7-258
Figure 3.7.2-77—Spectrum Envelope of Reactor Building Internal Structure - Elev. +63 ft, 11-3/4 inches (+19.50m) 2%, 3%, 4%, 5%, 7% and 10% Damping X-Direction	3.7-259
Figure 3.7.2-78—Spectrum Envelope of Reactor Building Internal Structure - Elev. +63 ft, 11-3/4 inches (+19.50m) 2%, 3%, 4%, 5%, 7% and 10% Damping Y-Direction	3.7-260
Figure 3.7.2-79—Spectrum Envelope of Reactor Building Internal Structure - Elev. +63 ft, 11-3/4 inches (+19.50m) 2%, 3%, 4%, 5%, 7% and 10% Damping Z-Direction	3.7-261
Figure 3.7.2-80—Spectrum Envelope of Safeguard Building 1 - Elev. +26 ft, 3 inches (+8.10m) 2%, 3%, 4%, 5%, 7% and 10% Damping X-Direction	3.7-262
Figure 3.7.2-81—Spectrum Envelope of Safeguard Building 1 - Elev. +26 ft, 3 inches (+8.10m) 2%, 3%, 4%, 5%, 7% and 10% Damping Y-Direction	3.7-263
Figure 3.7.2-82—Spectrum Envelope of Safeguard Building 1 - Elev. +26 ft, 3 inches (+8.10m) 2%, 3%, 4%, 5%, 7% and 10% Damping Z-Direction	3.7-264
Figure 3.7.2-83—Spectrum Envelope of Safeguard Building 1 - Elev. +68 ft, 10-3/4 inches (+21.00m) 2%, 3%, 4%, 5%, 7% and 10% Damping X-Direction	3.7-265
Figure 3.7.2-84—Spectrum Envelope of Safeguard Building 1 - Elev. +68 ft, 10-3/4 inches (+21.00m) 2%, 3%, 4%, 5%, 7% and 10% Damping Y-Direction	3.7-266
Figure 3.7.2-85—Spectrum Envelope of Safeguard Building 1 - Elev. +68 ft, 10-3/4 inches (+21.00m) 2%, 3%, 4%, 5%, 7% and 10% Damping Z-Direction	3.7-267

Figure 3.7.2-86—Spectrum Envelope of Safeguard Building 2&3 - Elev. +26 ft, 7 inches (+8.10m) 2%, 3%, 4%, 5%, 7% and 10% Damping X-Direction	3.7-268
Figure 3.7.2-87—Spectrum Envelope of Safeguard Building 2&3 - Elev. +26 ft, 7 inches (+8.10m) 2%, 3%, 4%, 5%, 7% and 10% Damping Y-Direction	3.7-269
Figure 3.7.2-88—Spectrum Envelope of Safeguard Building 2&3 - Elev. +26 ft, 7 inches (+8.10m) 2%, 3%, 4%, 5%, 7% and 10% Damping Z-Direction	3.7-270
Figure 3.7.2-89—Spectrum Envelope of Safeguard Building 2&3 - Elev. +50 ft, 6-1/4 inches (+15.40m) 2%, 3%, 4%, 5%, 7% and 10% Damping X-Direction	3.7-271
Figure 3.7.2-90—Spectrum Envelope of Safeguard Building 2&3 - Elev. +50 ft, 6-1/4 inches (+15.40m) 2%, 3%, 4%, 5%, 7% and 10% Damping Y-Direction	3.7-272
Figure 3.7.2-91—Spectrum Envelope of Safeguard Building 2&3 - Elev. +50 ft, 6-1/4 inches (+15.40m) 2%, 3%, 4%, 5%, 7% and 10% Damping Z-Direction	3.7-273
Figure 3.7.2-92—Spectrum Envelope of Safeguard Building 4 - Elev. +68 ft, 10-3/4 inches (+21.00m) 2%, 3%, 4%, 5%, 7% and 10% Damping X-Direction	3.7-274
Figure 3.7.2-93—Spectrum Envelope of Safeguard Building 4 - Elev. +68 ft, 10-3/4 inches (+21.00m) 2%, 3%, 4%, 5%, 7% and 10% Damping Y-Direction	3.7-275
Figure 3.7.2-94—Spectrum Envelope of Safeguard Building 4 - Elev. +68 ft, 10-3/4 inches (+21.00m) 2%, 3%, 4%, 5%, 7% and 10% Damping Z-Direction	3.7-276
Figure 3.7.2-95—Spectrum Envelope of Containment Building - Elev. +123 ft, 4-1/4 inches (+37.60m) 2%, 3%, 4%, 5%, 7% and 10% Damping X-Direction	3.7-277
Figure 3.7.2-96—Spectrum Envelope of Containment Building - Elev. +123 ft, 4-1/4 inches (+37.60m) 2%, 3%, 4%, 5%, 7% and 10% Damping Y-Direction	3.7-278
Figure 3.7.2-97—Spectrum Envelope of Containment Building - Elev. +123 ft, 4-1/4 inches (+37.60m) 2%, 3%, 4%, 5%, 7% and 10% Damping Z-Direction	3.7-279
Figure 3.7.2-98—Spectrum Envelope of Containment Building - Elev. +190 ft, 3-1/2 inches (+58.00m) 2%, 3%, 4%, 5%, 7% and 10% Damping X-Direction	3.7-280

Figure 3.7.2-99—Spectrum Envelope of Containment Building - Elev. +190 ft, 3-1/2 inches (+58.00m) 2%, 3%, 4%, 5%, 7% and 10% Damping Y-Direction	3.7-281
Figure 3.7.2-100—Spectrum Envelope of Containment Building - Elev. +190 ft, 3-1/2 inches (+58.00m) 2%, 3%, 4%, 5%, 7% and 10% Damping Z-Direction	3.7-282
Figure 3.7.2-101—Spectrum Envelope of EPGB at Elev. +0 ft, 0 inches at Node 1172 2%, 3%, 4%, 5%, 7% and 10% Damping X-Direction	3.7-283
Figure 3.7.2-102—Spectrum Envelope of EPGB at Elev. +0 ft, 0 inches at Node 1172 2%, 3%, 4%, 5%, 7% and 10% Damping Y-Direction	3.7-284
Figure 3.7.2-103—Spectrum Envelope of EPGB at Elev. +0 ft, 0 inches at Node 1172 2%, 3%, 4%, 5%, 7% and 10% Damping Z-Direction	3.7-285
Figure 3.7.2-104—Spectrum Envelope of ESWB at Elev +63 ft, 0 inches at Node 12733 2%, 3%, 4%, 5%, 7% and 10% Damping X-Direction	3.7-286
Figure 3.7.2-105—Spectrum Envelope of ESWB at Elev +63 ft, 0 inches at Node 12733 2%, 3%, 4%, 5%, 7% and 10% Damping Y-Direction	3.7-287
Figure 3.7.2-106—Spectrum Envelope of ESWB at Elev +63 ft, 0 inches at Node 12733 2%, 3%, 4%, 5%, 7% and 10% Damping Z-Direction	3.7-288
Figure 3.7.2-107—Spectrum Envelope of ESWB at Elev +14 ft, 0 inches at Node 10385 2%, 3%, 4%, 5%, 7% and 10% Damping X-Direction	3.7-289
Figure 3.7.2-108—Spectrum Envelope of ESWB at Elev +14 ft, 0 inches at Node 10385 2%, 3%, 4%, 5%, 7% and 10% Damping Y-Direction	3.7-290
Figure 3.7.2-109—Spectrum Envelope of ESWB at Elev +14 ft, 0 inches at Node 10385 2%, 3%, 4%, 5%, 7% and 10% Damping Z-Direction	3.7-291
Figure 3.8-1—Reactor Building Plan at Elevation -50 Feet	3.8-144
Figure 3.8-2—Reactor Building Plan at Elevation -20 Feet	3.8-145
Figure 3.8-3—Reactor Building Plan at Elevation -8 Feet	3.8-146
Figure 3.8-4—Reactor Building Plan at Elevation +5 Feet	3.8-147
Figure 3.8-5—Reactor Building Plan at Elevation +17 feet	3.8-148
Figure 3.8-6—Reactor Building Plan at Elevation +29 feet	3.8-149

Figure 3.8-7—Reactor Building Plan at Elevation +45 feet	3.8-150
Figure 3.8-8—Reactor Building Plan at Elevation +64 feet	3.8-151
Figure 3.8-9—Reactor Building Plan at Elevation +79 feet	3.8-152
Figure 3.8-10—Reactor Building Plan at Elevation +94 feet	3.8-153
Figure 3.8-11—Reactor Building Section A-A.....	3.8-154
Figure 3.8-12—Reactor Building Section B-B.....	3.8-155
Figure 3.8-13—Reactor Building Section C-C	3.8-156
Figure 3.8-14—Finite Element Model of Reactor Containment Building	3.8-157
Figure 3.8-15—Finite Element Model of Reactor Containment Building Dome Concrete.....	3.8-158
Figure 3.8-16—Finite Element Model of Reactor Containment Building Basemat Concrete.....	3.8-159
Figure 3.8-17—Finite Element Model of Reactor Containment Building Interface with Concrete Interior Structures.....	3.8-160
Figure 3.8-18—Finite Element Model of Reactor Containment Building Tendon Layout in Cylindrical Wall	3.8-161
Figure 3.8-19—Finite Element Model of Reactor Containment Building Tendon Layout in Dome	3.8-162
Figure 3.8-20—Accident Temperature versus Time (Reactor Containment Building)	3.8-163
Figure 3.8-21—Accident Pressure versus Time (Reactor Containment Building)	3.8-164
Figure 3.8-22—Temperature Gradient Through Cylinder Wall	3.8-165
Figure 3.8-23—Temperature Gradient Through Dome.....	3.8-166
Figure 3.8-24—Temperature Gradient Through Basemat.....	3.8-167
Figure 3.8-25—Equipment Hatch General Assembly	3.8-168
Figure 3.8-26—Personnel Airlock, Emergency Airlock General Overview	3.8-169
Figure 3.8-27—Containment Penetrations for Main Steam and Feedwater Pipes	3.8-170
Figure 3.8-28—Containment Penetrations for High Energy Pipes	3.8-171
Figure 3.8-29—Containment Standard Piping Penetrations – Single Pipe.....	3.8-172
Figure 3.8-30—Containment Standard Piping Penetrations – Multiple Pipes	3.8-173
Figure 3.8-31—Fuel Transfer Tube Penetration (Conceptual View).....	3.8-174
Figure 3.8-32—Reactor Building Internal Structures ANSYS Model	3.8-175

Figure 3.8-33—Reactor Building Internal Structures ANSYS Model – Section through Center of Building Looking West	3.8-176
Figure 3.8-34—Reactor Building Internal Structures ANSYS Model – Section through Reactor Cavity and Refueling Canal	3.8-177
Figure 3.8-35—Reactor Building Internal Structures ANSYS Model – Section through Center of Building Looking North	3.8-178
Figure 3.8-36—Reactor Building Internal Structures ANSYS Model – Section through Center of Building Looking Northwest	3.8-179
Figure 3.8-37—Reactor Building Internal Structures ANSYS Model – View of IRWST and Internal Structures Basemat	3.8-180
Figure 3.8-38—Fuel Building Plan Elevation -31 Feet.....	3.8-181
Figure 3.8-39—Fuel Building Plan Elevation -20 Feet.....	3.8-182
Figure 3.8-40—Fuel Building Plan Elevation -11 Feet.....	3.8-183
Figure 3.8-41—Fuel Building Plan Elevation 0 Feet.....	3.8-184
Figure 3.8-42—Fuel Building Plan Elevation +12 Feet.....	3.8-185
Figure 3.8-43—Fuel Building Plan Elevation +24 Feet.....	3.8-186
Figure 3.8-44—Fuel Building Plan Elevation +36 Feet.....	3.8-187
Figure 3.8-45—Fuel Building Plan Elevation +49 Feet.....	3.8-188
Figure 3.8-46—Fuel Building Plan Elevation +64 Feet.....	3.8-189
Figure 3.8-47—Fuel Building Plan Elevation +79 Feet.....	3.8-190
Figure 3.8-48—Fuel Building Plan Elevation +90 Feet.....	3.8-191
Figure 3.8-49—Fuel Building Plan Elevation +112 Feet.....	3.8-192
Figure 3.8-50—Fuel Building Plan Section A-A.....	3.8-193
Figure 3.8-51—Fuel Building Plan Section B-B.....	3.8-194
Figure 3.8-52—Fuel Building Plan Section C-C.....	3.8-195
Figure 3.8-53—Safeguard Building 1 Plan Elevation -31 Feet	3.8-196
Figure 3.8-54—Safeguard Building 1 Plan Elevation -16 Feet	3.8-197
Figure 3.8-55—Safeguard Building 1 Plan Elevation 0 Feet	3.8-198
Figure 3.8-56—Safeguard Building 1 Plan Elevation +15 Feet	3.8-199
Figure 3.8-57—Safeguard Building 1 Plan Elevation +27 Feet	3.8-200
Figure 3.8-58—Safeguard Building 1 Plan Elevation +39 Feet	3.8-201
Figure 3.8-59—Safeguard Building 1 Plan Elevation +55 Feet	3.8-202
Figure 3.8-60—Safeguard Building 1 Plan Elevation +69 Feet	3.8-203
Figure 3.8-61—Safeguard Building 1 Plan Elevation +81 Feet	3.8-204

Figure 3.8-62—Safeguard Building 1 Plan Elevation +96 Feet	3.8-205
Figure 3.8-63—Safeguard Building 1 Section A-A.....	3.8-206
Figure 3.8-64—Safeguard Buildings 2 and 3 Plan Elevation -31 Feet	3.8-207
Figure 3.8-65—Safeguard Buildings 2 and 3 Plan Elevation -16 Feet	3.8-208
Figure 3.8-66—Safeguard Buildings 2 and 3 Plan Elevation 0 Feet.....	3.8-209
Figure 3.8-67—Safeguard Buildings 2 and 3 Plan Elevation +15 Feet	3.8-210
Figure 3.8-68—Safeguard Buildings 2 and 3 Plan Elevation +27 Feet	3.8-211
Figure 3.8-69—Safeguard Buildings 2 and 3 Plan Elevation +39 Feet	3.8-212
Figure 3.8-70—Safeguard Buildings 2 and 3 Plan Elevation +53 Feet	3.8-213
Figure 3.8-71—Safeguard Buildings 2 and 3 Plan Elevation +69 Feet	3.8-214
Figure 3.8-72—Safeguard Buildings 2 and 3 Plan Elevation +79 Feet	3.8-215
Figure 3.8-73—Safeguard Buildings 2 and 3 Plan Elevation +94 Feet	3.8-216
Figure 3.8-74—Safeguard Buildings 2 and 3 Section B-B.....	3.8-217
Figure 3.8-75—Safeguard Building 4 Plan Elevation -31 Feet	3.8-218
Figure 3.8-76—Safeguard Building 4 Plan Elevation -16 Feet	3.8-219
Figure 3.8-77—Safeguard Building 4 Plan Elevation 0 Feet	3.8-220
Figure 3.8-78—Safeguard Building 4 Plan Elevation +15 Feet	3.8-221
Figure 3.8-79—Safeguard Building 4 Plan Elevation +26 Feet	3.8-222
Figure 3.8-80—Safeguard Building 4 Plan Elevation +39 Feet	3.8-223
Figure 3.8-81—Safeguard Building 4 Plan Elevation +55 Feet	3.8-224
Figure 3.8-82—Safeguard Building 4 Plan Elevation +69 Feet	3.8-225
Figure 3.8-83—Safeguard Building 4 Plan Elevation +81 Feet	3.8-226
Figure 3.8-84—Safeguard Building 4 Plan Elevation +96 Feet	3.8-227
Figure 3.8-85—Safeguard Building 4 Section A-A.....	3.8-228
Figure 3.8-86—ANSYS Finite Element Model of Nuclear Island Common Basemat Structure - Outside View.....	3.8-229
Figure 3.8-87—ANSYS Finite Element Model of Nuclear Island Common Basemat Structure - Section Through Fuel Building and Safeguard Building 2/3 Island	3.8-230
Figure 3.8-88—ANSYS Finite Element Model of Nuclear Island Common Basemat Structure - Section Through Safeguard Buildings 4 and 1	3.8-231
Figure 3.8-89—Emergency Power Generating Buildings Plan Elevation 0'-0"	3.8-232
Figure 3.8-90—Emergency Power Generating Buildings Plan Elevation 33'-4" ..	3.8-233

Figure 3.8-91—Emergency Power Generating Buildings Plan Elevation 51'-6"	3.8-234
Figure 3.8-92—Emergency Power Generating Buildings Plan Elevation 68'-0"	3.8-235
Figure 3.8-93—Emergency Power Generating Buildings Section A-A	3.8-236
Figure 3.8-94—Emergency Power Generating Buildings Section B-B	3.8-237
Figure 3.8-95—Essential Service Water Building Plan Elevation 0'-0"	3.8-238
Figure 3.8-96—Essential Service Water Building Plan Elevation 14'-0"	3.8-239
Figure 3.8-97—Essential Service Water Building Plan Elevation 47'-0"	3.8-240
Figure 3.8-98—Essential Service Water Building Plan Elevation 63'-0"	3.8-241
Figure 3.8-99—Essential Service Water Building Plan Elevation 80'-0"	3.8-242
Figure 3.8-100—Essential Service Water Building Roof Plan Elevation 96'-0" ...	3.8-243
Figure 3.8-101—Essential Service Water Building Section A-A.....	3.8-244
Figure 3.8-102—Essential Service Water Building Section B-B	3.8-245
Figure 3.8-103—Nuclear Island Common Basemat Structure Foundation Basemat ANSYS Model.....	3.8-246
Figure 3.8-104—Emergency Power Generating Building Foundation Basemat Model	3.8-247
Figure 3.8-105—Essential Service Water Building Foundation Basemat Model .	3.8-248
Figure 3.8-106—Elastic Displacement for Soil Case 1u	3.8-249
Figure 3.8-107—Elastic Displacement for Soil Case 2u	3.8-250
Figure 3.8-108—Elastic Displacement for Soil Case 1n2u	3.8-251
Figure 3.8-109—Elastic Displacement for Soil Case 3u	3.8-252
Figure 3.8-110—Elastic Displacement for Soil Case 4u	3.8-253
Figure 3.8-111—Elastic Displacement for Soil Case 5a	3.8-254
Figure 3.8-112—Elastic Displacement for Soil Case 5u	3.8-255
Figure 3.8-113—Elastic Displacement for Soil Case 2sn4u	3.8-256
Figure 3.8-114—Elastic Displacement for Soil Case 2n3u	3.8-257
Figure 3.8-115—Elastic Displacement for Soil Case 3r3u	3.8-258
Figure 3.8-116—Passive Soil Pressure	3.8-259
Figure 3.8-117—Geosynthetic Water Proofing Membrane	3.8-260
Figure 3.9.4-1—Control Rod Drive Mechanism Assembly	3.9-61
Figure 3.9.5-1—Reactor Pressure Vessel General Arrangement.....	3.9-74
Figure 3.9.5-2—Lower Reactor Internals.....	3.9-75
Figure 3.9.5-3—Reactor Pressure Vessel Heavy Reflector.....	3.9-76

Figure 3.9.5-4—Reactor Pressure Vessel Upper Internals.....	3.9-77
Figure 3.11-1—Harsh and Mild Zones in Safeguard Buildings.....	3.11-132
Figure 3B-1—Dimensional Arrangement Reference Plant Building Location.....	3.B-2
Figure 3B-2—Reactor Building Dimensional Plan at Elevation -15 m (-50 ft).....	3.B-3
Figure 3B-3—Reactor Building Dimensional Plan at Elevation -6.15 m (-20 ft).....	3.B-4
Figure 3B-4—Reactor Building Dimensional Plan at Elevation -2.3 m (-8 ft).....	3.B-5
Figure 3B-5—Reactor Building Dimensional Plan at Elevation +1.5 m (+5 ft).....	3.B-6
Figure 3B-6—Reactor Building Dimensional Plan at Elevation +5.15 m (+17 ft).....	3.B-7
Figure 3B-7—Reactor Building Dimensional Plan at Elevation +8.7 m (+29 ft).....	3.B-8
Figure 3B-8—Reactor Building Dimensional Plan at Elevation +13.8 m (+45 ft).....	3.B-9
Figure 3B-9—Reactor Building Dimensional Plan at Elevation +19.5 m (+64 ft)...	3.B-10
Figure 3B-10—Reactor Building Dimensional Plan at Elevation +24.1 m (+79 ft).	3.B-11
Figure 3B-11—Reactor Building Dimensional Plan at Elevation +28.5 m (+94 ft).	3.B-12
Figure 3B-12—Reactor Building Dimensional Section A-A	3.B-13
Figure 3B-13—Reactor Building Dimensional Section B-B	3.B-14
Figure 3B-14—Reactor Building Dimensional Section C-C	3.B-15
Figure 3B-15—Fuel Building Dimensional Plan Elevation -9.6 m (-31 ft)	3.B-16
Figure 3B-16—Fuel Building Dimensional Plan Elevation -6.2 m (-20 ft)	3.B-17
Figure 3B-17—Fuel Building Dimensional Plan Elevation -3.4 m (-11 ft)	3.B-18
Figure 3B-18—Fuel Building Dimensional Plan Elevation 0 m (0 ft).....	3.B-19
Figure 3B-19—Fuel Building Dimensional Plan Elevation +3.7 m (+12 ft)	3.B-20
Figure 3B-20—Fuel Building Dimensional Plan Elevation +7.4 m (+24 ft)	3.B-21
Figure 3B-21—Fuel Building Dimensional Plan Elevation +11.1 m (+36 ft)	3.B-22
Figure 3B-22—Fuel Building Dimensional Plan Elevation +14.8 m (+49 ft)	3.B-23
Figure 3B-23—Fuel Building Dimensional Plan Elevation +19.5 m (+64 ft)	3.B-24
Figure 3B-24—Fuel Building Dimensional Plan Elevation +24.2 m (+79 ft)	3.B-25
Figure 3B-25—Fuel Building Dimensional Plan Elevation +27.4 m (+90 ft)	3.B-26
Figure 3B-26—Fuel Building Dimensional Plan Elevation +34 m (+112 ft)	3.B-27
Figure 3B-27—Fuel Building Dimensional Section A-A	3.B-28
Figure 3B-28—Fuel Building Dimensional Section B-B	3.B-29
Figure 3B-29—Fuel Building Dimensional Section C-C.....	3.B-30
Figure 3B-30—Safeguard Building 1 Dimensional Plan Elevation -9.6 m (-31 ft)	3.B-31

Figure 3B-31—Safeguard Building 1 Dimensional Plan Elevation -5.0 m (-16 ft)	3.B-32
Figure 3B-32—Safeguard Building 1 Dimensional Plan Elevation 0 m (0 ft)	3.B-33
Figure 3B-33—Safeguard Building 1 Dimensional Plan Elevation +4.7 m (+15 ft)	3.B-34
Figure 3B-34—Safeguard Building 1 Dimensional Plan Elevation +8.1 m (+27 ft)	3.B-35
Figure 3B-35—Safeguard Building 1 Dimensional Plan Elevation +12 m (+39 ft)	3.B-36
Figure 3B-36—Safeguard Building 1 Dimensional Plan Elevation +16.8 m (+55 ft)	3.B-37
Figure 3B-37—Safeguard Building 1 Dimensional Plan Elevation +21 m (+69 ft)	3.B-38
Figure 3B-38—Safeguard Building 1 Dimensional Plan Elevation +24.7 m (+81 ft)	3.B-39
Figure 3B-39—Safeguard Building 1 Dimensional Plan Elevation +29.3 m (+96 ft)	3.B-40
Figure 3B-40—Safeguard Building 1 Dimensional Section A-A	3.B-41
Figure 3B-41—Safeguard Buildings 2 and 3 Dimensional Plan Elevation -9.6 m (-31 ft)	3.B-42
Figure 3B-42—Safeguard Buildings 2 and 3 Dimensional Plan Elevation -5 m (-16 ft)	3.B-43
Figure 3B-43—Safeguard Buildings 2 and 3 Dimensional Plan Elevation 0 m (0 ft)	3.B-44
Figure 3B-44—Safeguard Buildings 2 and 3 Dimensional Plan Elevation +4.7 (+15 ft)	3.B-45
Figure 3B-45—Safeguard Buildings 2 and 3 Dimensional Plan Elevation +8.1 m (+27 ft)	3.B-46
Figure 3B-46—Safeguard Buildings 2 and 3 Dimensional Plan Elevation +12 m (+39 ft)	3.B-47
Figure 3B-47—Safeguard Buildings 2 and 3 Dimensional Plan Elevation +16.3 m (+53 ft)	3.B-48
Figure 3B-48—Safeguard Buildings 2 and 3 Dimensional Plan Elevation +21 m (+69 ft)	3.B-49
Figure 3B-49—Safeguard Buildings 2 and 3 Dimensional Plan Elevation +24 m (+79 ft)	3.B-50

Figure 3B-50—Safeguard Buildings 2 and 3 Dimensional Plan Elevation +28.8 m (+94 ft)	3.B-51
Figure 3B-51—Safeguard Buildings 2 and 3 Dimensional Section B-B.....	3.B-52
Figure 3B-52—Safeguard Building 4 Dimensional Plan Elevation -9.6 m (-31 ft)	3.B-53
Figure 3B-53—Safeguard Building 4 Dimensional Plan Elevation -5 m (-16 ft)	3.B-54
Figure 3B-54—Safeguard Building 4 Dimensional Plan Elevation 0 m (0 ft).....	3.B-55
Figure 3B-55—Safeguard Building 4 Dimensional Plan Elevation +4.7 m (+15 ft)	3.B-56
Figure 3B-56—Safeguard Building 4 Dimensional Plan Elevation +8.1 m (+27 ft)	3.B-57
Figure 3B-57—Safeguard Building 4 Dimensional Plan Elevation +12 m (+39 ft)	3.B-58
Figure 3B-58—Safeguard Building 4 Dimensional Plan Elevation +16.8 m (+55 ft)	3.B-59
Figure 3B-59—Safeguard Building 4 Dimensional Plan Elevation +21 m (+69 ft)	3.B-60
Figure 3B-60—Safeguard Building 4 Dimensional Plan Elevation +24.7 m (+81 ft)	3.B-61
Figure 3B-61—Safeguard Building 4 Dimensional Plan Elevation +29.3 m (+96 ft)	3.B-62
Figure 3B-62—Safeguard Building 4 Dimensional Section A-A	3.B-63
Figure 3B-63—Emergency Power Generating Buildings Dimensional Plan Elevation 0 m (0 ft).....	3.B-64
Figure 3B-64—Emergency Power Generating Buildings Dimensional Plan Elevation +10.16 m (+33 ft).....	3.B-65
Figure 3B-65—Emergency Power Generating Buildings Dimensional Plan Elevation +15.7 m (+52 ft).....	3.B-66
Figure 3B-66—Emergency Power Generating Buildings Dimensional Plan Elevation 20.72 m (+68 ft).....	3.B-67
Figure 3B-67—Emergency Power Generating Buildings Dimensional Section A-A	3.B-68
Figure 3B-68—Emergency Power Generating Buildings Dimensional Section B-B	3.B-69
Figure 3B-69—Essential Service Water Building Dimensional Plan Elevation 0 m (0 ft).....	3.B-70

Figure 3B-70—Essential Service Water Building Dimensional Plan Elevation +4.27 m (+14 ft)	3.B-71
Figure 3B-71—Essential Service Water Building Dimensional Plan Elevation +14.33 m (+47 ft)	3.B-72
Figure 3B-72—Essential Service Water Building Dimensional Plan Elevation +19.2 m (+63 ft)	3.B-73
Figure 3B-73—Essential Service Water Building Dimensional Plan Elevation +24.38 m (+80 ft)	3.B-74
Figure 3B-74—Essential Service Water Building Roof Dimensional Plan Elevation +29.26 m (+96 ft)	3.B-75
Figure 3B-75—Essential Service Water Building Dimensional Section A-A.....	3.B-76
Figure 3B-76—Essential Service Water Building Dimensional Section B-B.....	3.B-77
Figure 3C-1—RCS Primary Side Hydraulic Model	3.C-31
Figure 3C-2—SG Secondary Side Hydraulic Model	3.C-32
Figure 3C-3—RPV Isolated Hydraulic Model.....	3.C-33
Figure 3C-4—ACP Hydraulic Model	3.C-34
Figure 3C-5—RCS Four-Loop Structural Model	3.C-35
Figure 3C-6—SG Detailed Structural Model.....	3.C-38
Figure 3C-7—RCP Detailed Structural Model	3.C-39
Figure 3C-8—RPV Isolated Structural Model	3.C-40
Figure 3C-9—Rayleigh Damping Curve	3.C-41
Figure 3D-1—Typical Combined LOCA/SLB Inside Containment Temperature Service Conditions Envelope.....	3.D-33
Figure 3D-2—Typical Combined LOCA/SLB Inside Containment Pressure Service Conditions Envelope.....	3.D-34
Figure 3D-3—Outside Containment Temperature Service Conditions Envelope (Feedwater Valve Compartment)	3.D-35
Figure 3D-4—Outside Containment Pressure Service Conditions Envelope (Feedwater Valve Compartment)	3.D-36
Figure 3D-5—Outside Containment Temperature Service Conditions Envelope (Main Steam Valve Compartment)	3.D-37
Figure 3D-6—Outside Containment Pressure Service Conditions Envelope (Main Steam Valve Compartment)	3.D-38
Figure 3D.D-1—Time Retention versus Temperature	3.D-93
Figure 3E.1-1—ANSYS Analysis Results for Nuclear Island Elements.....	3.E-64
Figure 3E.1-2—Gusset Section of RCB.....	3.E-65

Figure 3E.1-3—Cross-Section of Gusset	3.E-66
Figure 3E.1-4—180° FEM Gusset Segment of Containment Foundation	3.E-67
Figure 3E.1-5—Gusset Section - Typical Reinforcement	3.E-68
Figure 3E.1-6—Plan View of Equipment Hatch Area	3.E-69
Figure 3E.1-7—FEM of Equipment Hatch Area - Outer View.....	3.E-70
Figure 3E.1-8—FEM of Equipment Hatch Area - Inner View.....	3.E-71
Figure 3E.1-9—Cross-Section of Equipment Hatch Area.....	3.E-72
Figure 3E.1-10—Elevation View of Equipment Hatch Area Showing Cuts.....	3.E-73
Figure 3E.1-11—Sections 1-1 and 2-2 of the Equipment Hatch Area	3.E-74
Figure 3E.1-12—Reinforcement Pattern for Section 1-1 of the Equipment Hatch Area	3.E-75
Figure 3E.1-13—Reinforcement Pattern for Section 2-2 of the Equipment Hatch Area	3.E-76
Figure 3E.1-14—Reinforcement Pattern for Section 3-3 of the Equipment Hatch Area	3.E-77
Figure 3E.1-15—Elevation View of the Entire RCB	3.E-78
Figure 3E.1-16—Section Cut Through Entire RCB.....	3.E-79
Figure 3E.1-17—Elevation View of Critical Section	3.E-80
Figure 3E.1-18—Section View Cut Through Critical Section.....	3.E-81
Figure 3E.1-19—Plan View Cut Through Critical Section.....	3.E-82
Figure 3E.1-20—Elevation View of Buttress 3.....	3.E-83
Figure 3E.1-21—Plan View Cut Through Typical Narrow Buttress	3.E-84
Figure 3E.1-22—Plan View Cut Through Typical Wide Buttress.....	3.E-85
Figure 3E.1-23—Containment Wall Reinforcement (Typical Section)	3.E-86
Figure 3E.1-24—Containment Buttress Reinforcement (Typical Narrow Section)	3.E-87
Figure 3E.1-25—Containment Buttress Reinforcement (Typical Wide Section)....	3.E-88
Figure 3E.1-26—Floor Slab Plan View at Elevation 4'-11 1/16"	3.E-89
Figure 3E.1-27—Typical Cavity Walls Plan View	3.E-90
Figure 3E.1-28—Isolated View of FEM For Floor Slab and SG/RCP Wing Wall....	3.E-91
Figure 3E.1-29—Isolated View of FEM For Floor Slab and SG/RCP Separation Wall.....	3.E-92
Figure 3E.1-30—Area of Detail for Floor Slab at Elevation 4'-11 1/16"	3.E-93
Figure 3E.1-31—Reinforcement of Floor Slab at Elevation 4'-11 1/16"	3.E-94
Figure 3E.1-32—Area of Detail for Floor Slab at Elevation 4'-11 1/16"	3.E-95

Figure 3E.1-33—Reinforcement of Floor Slab Section 3-3.....	3.E-96
Figure 3E.1-34—Reinforcement of Floor Slab Section 2-2.....	3.E-97
Figure 3E.1-35—Area of Detail for SG/RCP Wing Wall Bottom	3.E-98
Figure 3E.1-36—SG/RCP Wing Wall Bottom Reinforcement.....	3.E-99
Figure 3E.1-37—Area of Detail for SG/RCP Wing Wall Top	3.E-100
Figure 3E.1-38—SG/RCP Wing Wall Top Reinforcement.....	3.E-101
Figure 3E.1-39—Area of Detail for SG Separation Wall Bottom.....	3.E-102
Figure 3E.1-40—SG Separation Wall Bottom Reinforcement	3.E-103
Figure 3E.1-41—Area of Detail for SG Separation Wall Top.....	3.E-104
Figure 3E.1-42—SG Separation Wall Top Reinforcement	3.E-105
Figure 3E.1-43—Location of PZR Cubical.....	3.E-106
Figure 3E.1-44—PZR Isometric View Showing Support Locations	3.E-107
Figure 3E.1-45—Plan View of FEM for Floor Slab of PZR Cubical	3.E-108
Figure 3E.1-46—Elevation View of FEM for Wall Section of PZR Cubical	3.E-109
Figure 3E.1-47—PZR Floor Slab Section - Reinforcement at Support.....	3.E-110
Figure 3E.1-48—PZR Wall Section - Typical Reinforcement	3.E-111
Figure 3E.1-49—RB Operating Floor - Elevation 63'-11 11/16" Showing Section Locations.....	3.E-112
Figure 3E.1-50—Plan View of RB Operating Floor Showing Rooms	3.E-113
Figure 3E.1-51—RB Operating Floor Reinforcement - Section 1-1.....	3.E-114
Figure 3E.1-52—RB Operating Floor Reinforcement - Section 2-2.....	3.E-115
Figure 3E.1-53—RB Operating Floor Reinforcement - Section 3-3 and 4-4.....	3.E-116
Figure 3E.1-54—RB Operating Floor Reinforcement - Section 5-5.....	3.E-117
Figure 3E.1-55—RB Operating Floor Reinforcement - Section 6-6.....	3.E-118
Figure 3E.1-56—RB Operating Floor Reinforcement - Section 7-7	3.E-119
Figure 3E.1-57—RB Operating Floor Reinforcement - Section 8-8	3.E-120
Figure 3E.1-58—RSB Wall Vertical Design Boundaries.....	3.E-121
Figure 3E.1-59—FB Roof and RSB Wall Design Boundaries.....	3.E-122
Figure 3E.1-60—SB 2&3 Roof and RSB Wall Design Boundaries	3.E-123
Figure 3E.1-61—Isometric FEM of FB Roof to RSB Wall Connection.....	3.E-124
Figure 3E.1-62—Isometric FEM of SB 2 and 3 Roof to RSB Wall Connection ...	3.E-125
Figure 3E.1-63—RSB Wall to Roof Connection - Typical Reinforcement	3.E-126
Figure 3E.1-64—Location of SB1 South and West Walls Below Grade	3.E-127

Figure 3E.1-65—Location of SB4 North and East Walls Below Grade.....	3.E-128
Figure 3E.1-66—SB1 Wall A13001 Isometric View	3.E-129
Figure 3E.1-67—SB1 Wall A13003 Isometric View	3.E-130
Figure 3E.1-68—SB4 Wall A33008 Isometric View	3.E-131
Figure 3E.1-69—SB4 Wall A33003 Isometric View	3.E-132
Figure 3E.1-70—Cross Section of Walls A13001, A13003, A33008, and A33003 Showing Reinforcement.....	3.E-133
Figure 3E.1-71—Isometric FEM of NI Foundation Basemat.....	3.E-134
Figure 3E.1-72—Elevation View of RB Internal Structure Base Slab	3.E-135
Figure 3E.1-73—Reinforcement Pattern for NI Foundation Base Mat (Except Below RCB)	3.E-136
Figure 3E.1-74—Reinforcement Pattern for RB Internal Structures Base Slab - Elevation -25'-7" to -20'-2"	3.E-137
Figure 3E.1-75—Reinforcement Pattern for RB Internal Structures Base Slab - Elevation -25'-7" to -7'-6 1/2"	3.E-138
Figure 3E.1-76—Reinforcement Pattern for NI Foundation Base Mat below RCB	3.E-139
Figure 3E.2-1—GT STRUDL Finite Element Planar Reference Frame System...	3.E-154
Figure 3E.2-2—EPGB Basemat Foundation -- FEM	3.E-155
Figure 3E.2-3—Reinforcement Sketch for EPGB Basemat Foundation.....	3.E-156
Figure 3E.2-4—EPGB Wall at Column Line 11 - GT STRUDL FEM	3.E-157
Figure 3E.2-5—EPGB Sign Convention for Horizontal and Vertical Cuts at Column Line 11.....	3.E-158
Figure 3E.2-6—Nomenclature for Section Cuts through EPGB Wall at Column Line 11	3.E-159
Figure 3E.2-7—FEM of Highly Stressed Areas of EPGB Wall at Column Line 11	3.E-160
Figure 3E.2-8—Reinforcement Sketch for EPGB Wall at Column Line 11	3.E-161
Figure 3E.2-9—EPGB Slab at Elevation 51'-6"	3.E-162
Figure 3E.2-10—Elevation View of EPGB Critical section at Elevation 51'-6".....	3.E-163
Figure 3E.2-11—FEM View of EPGB Elevation 51'-6"	3.E-164
Figure 3E.2-12—Design Sketch of EPGB Elevation 51'-6"	3.E-165
Figure 3E.3-1—GT STRUDL Finite Element Planar Reference Frame System...	3.E-179
Figure 3E.3-2—ESWB Basemat Foundation - FEM	3.E-180
Figure 3E.3-3—Reinforcement Sketch for ESWB Basemat Foundation	3.E-181

Figure 3E.3-4—ESWB Wall at Column Line 4 - FEM	3.E-182
Figure 3E.3-5—Sign Convention for ESWB Horizontal and Vertical Cuts at Column Line 4.....	3.E-183
Figure 3E.3-6—Vertical and Horizontal Section Cuts for ESWB Wall at Column Line 4.....	3.E-184
Figure 3E.3-7—Reinforcement Configuration for ESWB Wall at Column Line 4. 3.E-185	
Figure 3E.3-8—ESWB Fan Deck Slab at Elevation 63 ft, 0 inches-FEM	3.E-186
Figure 3E.3-9—Reinforcement Sketch for ESWB Fan Deck Slab at Elevation 63 ft, 0 inches.....	3.E-187