

3.2 Classification of Structures, Components, and Systems

The information in this section of the reference ABWR DCD, including all subsections, tables and figures, [as modified by the STP Nuclear Operating Company Application to Amend the Design Certification rule for the U.S. Advanced Boiling Water Reactor \(ABWR\). "ABWR STP Aircraft Impact Assessment \(AIA\) Amendment Revision 3." dated September 23, 2010](#) is incorporated by reference with the following departures and supplement (Hot Machine Shop). Note that the departures used for Table 3.2-1 are numbered with {} brackets.

{7} STD DEP T1 2.4-3 Reactor Core Isolation Cooling System

{6} STD DEP T1 2.14-1 Hydrogen Recombiner Requirements Elimination

{8} STP DEP T1 5.0-1 Site Parameters

{4} STD DEP 9.3-2 Breathing Air System

{5} STD DEP T1 2.15-1 Radwaste Building

{1} STD DEP T1 3.4-1 Safety Related I&C Architecture

{2} STD DEP 8.3-1 Plant Medium Voltage Electrical System Design

{3} STD DEP 9.1-1 Fuel Storage and Handling

3.2.3S Safety Classifications of Site-Specific Systems

Verification of the design of site-specific systems will assure that the appropriate design code requirements for the system's safety class have been implemented in the design. These verification activities normally will be completed before the design outputs are used for activities such as procurement, manufacture or construction. When such timing cannot be achieved, the design verification will be completed prior to fuel load. (COM 3.2-1)

Table 3.2-1 Classification Summary

| The classification information is presented by System* in the following order: | | |
|--|-------------------------|---|
| Item No. | MPL Number [†] | Title |
| C Control and Instrument Systems | | |
| <i>C7</i> | <i>C71</i> | <i>Reactor Protection System Trip and Isolation System</i> ‡ {1} |
| <i>C11</i> | <i>C91</i> | <i>Process Computer (Includes PMCS and PGCS) Plant Information and Control System</i> {1} |
| <i>C14</i> | <i>C74</i> | <i>ESF Logic and Control System</i> {1} |
| H Control Panels | | |
| <i>H6</i> | <i>H23</i> | <i>Multiplexing System</i> {1} |
| N Power Cycle Systems | | |
| N6.1 | N30 | Turbine Supervisory System |
| <i>N17</i> | <i>N42</i> | <i>Hydrogen Gas Cooling System</i> |
| <i>N23</i> | <i>N71</i> | <i>Circulating Water System</i> |
| P Station Auxiliary Systems | | |
| <i>P1</i> | <i>P11</i> | <i>Makeup Water System (Purified)</i> |
| P8 (See U16) | P40 (See U80) | Ultimate Heat Sink (Ultimate Heat Sink and Associated Structures) |
| <i>P9</i> | <i>P41</i> | <i>Reactor Service Water System</i> |
| P24 | P96 | Vibration Monitoring System |
| R Station Electrical Systems | | |
| <i>R16</i> | <i>R51</i> | <i>Communication System</i> |
| S Power Transmission Systems | | |
| S0 | S11 | Main Power Transformer |
| T Containment and Environmental Control Systems | | |
| <i>T8</i> | <i>T49</i> | <i>Flammability Control System</i> {6} |
| U Structures and Servicing Systems | | |
| U0 | U10 | Makeup Water Treatment Building |
| U0.1 | U12 | Sewage Treatment Building |
| U0.2 | U14 | Training Center/Simulator Building |
| U0.3 | U15 | Warehouses |
| <i>U1</i> | <i>U21</i> | <i>Foundation Work</i> |
| <i>U6</i> | <i>U43</i> | <i>Fire Protection System</i> |
| U9.1 | U62 | Waste Water Retention Basin |
| U9.2 | U65 | Low Level Radwaste Storage |
| <i>U12</i> | <i>U73/U82</i> | <i>Control Building</i> ‡ / Control Building Annex |
| <i>U13</i> | <i>U74</i> | <i>Radwaste Building</i> |
| U15 | U79 | Miscellaneous Buildings (e.g., Communications, Meteorology Lab) |
| U17 | U81 | Firewater Pump House |

Table 3.2-1 Classification Summary (Continued)

| The classification information is presented by System* in the following order: | | |
|--|-------------------------|--|
| Item No. | MPL Number [†] | Title |
| U18 | U90 | Fire Detection System |
| U19 | U95 | Hot Machine Shop |
| U20 (See P8) | U80 (See P40) | Ultimate Heat Sink and Associated Structures |
| W Intake Structure and Servicing Equipment | | |
| W1 | W12 | Power Cycle Heat Sink Pumphouse (Circulation Water Intake Structure) |
| W2 | W13 | Circulation Water Discharge Structure |
| W3 | W32 | Screen Cleaning Facility |
| W4 | W33 | Screen |
| W5 | W41 | Reservoir Makeup Pumping Facility |
| Y Yard Structures and Equipment | | |
| Y1.1 | Y46 | Cathodic Protection System |
| Y1.2 | Y51 | Yard Miscellaneous Drain System |
| Y2.1 | Y53 | Chemical Storage and Transfer Systems |
| Y2.2 | Y71 | Reactor Service Water Pipe Tunnel |
| Y2.3 | Y72 | Radwaste Pipe Tunnel |

Table 3.2-1 Classification Summary (Continued)

| Principal Component ^a | Safety Class ^b | Location ^c | Quality Group Classification ^d | Quality Assurance Requirement ^e | Seismic Category ^f | Notes |
|--|---------------------------|-----------------------|---|--|-------------------------------|---------|
| C7 Reactor Protection System-Trip and Isolation System {1} | | | | | | |
| C11 Process Computer (includes-PMCS & PGCS) Plant Information and Control System {1} | N | X | — | E | — | |
| C14 ESF Logic and Control System {1} | 3 | SC, X, T, RZ | — | B | I | |
| D3 Containment Atmospheric Monitoring System {6} | | | | | | |
| 2. Components with nonsafety-related function (hydrogen and oxygen monitors) | N | C,SC,X,RZ | — | E | — | |
| E4 RCIC System {7} | | | | | | |
| 2. Piping including supports—discharge line from vacuum pump to containment isolation valves, and discharge line from condensate pump to the first globe valve <u>Not Used</u> | N | SC | G | E | — | (g) |
| 4. RCIC Turbine-Pump and piping including support, CST suction line from the first RCIC motorized valve, S/P suction line to the pump, discharge line up to the FW line “B” thermal sleeve | 2 | SC, M | B | B | I | (g) (m) |
| 9. Turbine including supports <u>Not Used</u> | 2 | SC | — | B | I | (m) |
| F1 Fuel Servicing Equipment {3} | N/2 | SC | —/B | E/B | — | (x) |

Table 3.2-1 Classification Summary (Continued)

| Principal Component ^a | Safety Class ^b | Location ^c | Quality Group Classification ^d | Quality Assurance Requirement ^e | Seismic Category ^f | Notes |
|---|---------------------------|-----------------------------|---|--|-------------------------------|-------|
| <i>H6 Multiplexing System {1}</i> | | | | | | |
| 1. <i>Electrical module with safety-related functions (Essential)</i> | 3 | RZ,X | — | B | I | |
| 2. <i>Cable with safety-related functions (Essential)</i> | 3 | RZ,X | — | B | I | |
| 3. <i>Other electrical modules and cables (Non-essential)</i> | N | SC,RZ,X, W | — | E | — | |
| N6.1 Turbine Supervisory System | N | T | — | — | — | |
| <i>N17 Hydrogen Gas Cooling System</i> | <i>N</i> | <i>T, O</i> | — | <i>E</i> | — | |
| <i>N23 Circulating Water System</i> | <i>N</i> | <i>T, O</i> | <i>D</i> | <i>E</i> | — | |
| <i>P1 Makeup Water System (Purified)</i> | | | | | | |
| 2. <i>Piping including supports and valves</i> | <i>N</i> | <i>SC,RZ,T, H,W,X,O</i> | <i>D</i> | <i>E</i> | — | |
| <i>P8 (See U16) Ultimate Heat Sink (Ultimate Heat Sink and Associated Structures) UHS Basin, Cooling Tower Structural Elements, and RSW Pumphouse</i> | 3 | O,U | C,— | B | I | |
| <i>P9 Reactor Service Water System</i> | | | | | | |
| 1. <i>Safety-related piping including supports, piping and valves, pumps and strainers</i> | 3 | U,O,X | C | B | I | |
| 2. <i>Electrical modules and cables with safety-related functions, including cooling tower fans, fan motors and controls</i> | 3 | RZ,U,O,X | — | B | I | |

Table 3.2-1 Classification Summary (Continued)

| Principal Component ^a | Safety Class ^b | Location ^c | Quality Group Classification ^d | Quality Assurance Requirement ^e | Seismic Category ^f | Notes |
|--|---------------------------|------------------------------|---|--|-------------------------------|-------|
| P19 Breathing Air System {4} | N | C,SC,T | — | E | — | |
| 1. Containment Isolation including supports, valves and piping | 2 | C,SC | B | B | I | |
| 2. Other mechanical and electrical components | N | C,SC,RT, MCH | — | E | — | |
| P24 Vibration Monitoring System | N | C,O,RZ, SC,T,X,F, U,P | — | E/— | — | |
| R5 Metalclad Switchgear {2} | | | | | | |
| 1. Safety-related 6900 4160 Volt switchgear | 3 | RZ | — | B | I | |
| R16 Communication System | N | SC,C,RZ, X,O,H,T, M,W,F,U, P | — | B | I | |
| S0 Main Power Transformer | N | O | — | — | — | |
| T8 Flammability Control System {6} | 2 | SC | B | B | I | |
| U0 Makeup Water Treatment Building | N | O | — | — | — | |
| U0.1 Sewage Treatment Building | N | O | — | — | — | |
| U0.2 Training Center/Simulator Building | N | O | — | — | — | |
| U0.3 Warehouses | N | O | — | — | — | |
| U1 Foundation Work | 2/3 | C,SC,RZ, U | — | B | I | |
| U5 Heating, Ventilation and Air Conditioning** | | | | | | |
| 1. Safety-related equipment ^{††} | | | | | | |
| a. Fan-coil cooling units | 3 | SC,RZ,X, U | — | B | I | |

Table 3.2-1 Classification Summary (Continued)

| Principal Component ^a | Safety Class ^b | Location ^c | Quality Group Classification ^d | Quality Assurance Requirement ^e | Seismic Category ^f | Notes |
|--|---------------------------|-------------------------------|---|--|-------------------------------|---------|
| <i>b. Heating units—electrical or water</i> | 3 | SC,RZ,X, U | — | B | I | |
| <i>c. Blowers—Air supply or</i> | 3 | SC,RZ,X, U | — | B | I | |
| <i>d. Ductwork</i> | 3 | SC,RZ,X, U | — | B | I | |
| <i>e. Filters—Equipment areas</i> | 3 | SC,RZ,X, U | — | B | I | |
| <i>h. Other safety-related valves and dampers</i> | 3 | RZ,X,U | — | B | I | |
| <i>i. Electrical modules with safety-related functions</i> | 3 | SC,RZ,X, U | — | B | I | |
| <i>j. Cable with safety-related functions</i> | 3 | SC,RZ,X, U | — | B | I | |
| U6 Fire Protection System | | | | | | |
| <i>1. Other Piping including supports and valves</i> | N | SC,X,RZ, H,T,W,O, F,U,P | D | E | — | (t) (u) |
| <i>5. Electrical Modules</i> | N | SC,X,RZ, H,T,W,F, U,P,O | — | E | — | (t) (u) |
| <i>7. Cables</i> | N | SC,X,RZ, H,T,W,F, U,P,O | — | E | — | (t) (u) |
| <i>8. Sprinklers or deluge water systems</i> | N | H,W,SC, RZ,T,O,X, U,P | D | E | — | (t) (u) |
| <i>9. Foam reaction or deluge water systems</i> | N | RZ,T,O | — | E | — | (t) (u) |
| U9.1 Waste Water Retention Basin | N | O | — | — | — | |
| U9.2 Low Level Radwaste Storage | N | O | — | E | — | (p) |
| <i>U10 Reactor Building {8}</i> | 3 | C,SC,RZ M | — | B | I | (ii) |

Table 3.2-1 Classification Summary (Continued)

| Principal Component ^a | Safety Class ^b | Location ^c | Quality Group Classification ^d | Quality Assurance Requirement ^e | Seismic Category ^f | Notes |
|---|---------------------------|-----------------------|---|--|-------------------------------|---------|
| U12 Control Building {8} | 3 | X | — | B | I | (ii) |
| U12 Control Building/Control Building Annex | 3/N | X | — | B/E | //— | |
| U13 Radwaste Building {5} | N | W | — | E | — | (p) |
| 1. Structural walls and slabs above grade level (see Subsection 3H.3.3.) | N | W | — | E | — | |
| 2. Radwaste Building Substructure | 3 | W | — | B | I | |
| U15 Miscellaneous Buildings (e.g., Communications, Meteorology Lab) | N | O | — | — | — | |
| U17 Firewater Pump House | N | F | — | E | — | (t) (u) |
| U18 Fire Detection System | N | All | — | E | — | (t) (u) |
| U19 Hot Machine Shop | N | MCH | — | E | — | |
| U20 (See P8) Ultimate Heat Sink and Associated Structures | | | | | | |
| W1 Power Cycle Heat Sink Pumphouse (Circulation Water Intake Structure) | N | P | — | — | — | |
| W2 Circulation Water Discharge Structure | N | O | — | — | — | |
| W3 Screen Cleaning Facility | N | O | — | — | — | |
| W4 Screen | N | O | — | — | — | |
| W5 Reservoir Makeup Pumping Facility | N | O | — | — | — | |
| Y1.1 Cathodic Protection System | N | O | — | — | — | |
| Y1.2 Yard Miscellaneous Drain System | N | O | — | — | — | |
| Y2.1 Chemical Storage and Transfer Systems | N | O | — | — | — | |

Table 3.2-1 Classification Summary (Continued)

| Principal Component ^a | Safety Class ^b | Location ^c | Quality Group Classification ^d | Quality Assurance Requirement ^e | Seismic Category ^f | Notes |
|--|---------------------------|-----------------------|---|--|-------------------------------|-------|
| Y2.2 Reactor Service Water Pipe Tunnel | 3 | O | — | B | I | |
| Y2.3 Radwaste Pipe Tunnel | N | O | — | E | — | (p) |
| <u>Y2</u> <u>Diesel Generator Fuel Oil Storage and Transfer System including Fuel Oil Storage Vaults</u> | <u>3</u> | <u>O,RZ</u> | <u>—</u> | <u>B</u> | <u>I</u> | |
| <u>Y3</u> <u>Site Security</u> | <u>N</u> | <u>ALL</u> | <u>—</u> | <u>E</u> | <u>—</u> | |

Table 3.2-1 Notes and Footnotes

c. MCH = Hot Machine Shop

X = Control Building/Control Building Annex

U = Ultimate Heat Sink Pump House* (Ultimate Heat Sink and Associated Structures)

P = Power Cycle Heat Sink Pump House* (Turbine Service Water Pump House or Circulation Water Intake Structure)

*Pump House Structures are out of the ABWR Standard Plant Scope. The names in the parentheses are also used in the DCD, COLA, or site-specific MPL.

m. ~~The RCIC turbine and pump are designed and fabricated to ASME Code Section III, and pump are designed and fabricated to ASME Code Section III. is not included in the scope of standard codes. To assure that the turbine is fabricated to the standards commensurate with safety and performance requirements, General Electric has established specific design requirements for this component which are as follows:~~

- ~~1. All welding shall be qualified in accordance with Section IX, ASME Boiler and Pressure Vessel Code.~~
- ~~2. All pressure containing castings and fabrications shall be hydrotested at 1.5 times the design pressure.~~
- ~~3. All high pressure castings shall be radiographed according to:~~
 - ~~ASTM E-94~~
 - ~~E-141~~
 - ~~E-142 Maximum feasible volume~~
 - ~~E-446, 186 or 280 Severity level 3~~
- ~~4. As cast surfaces shall be magnetic particle or liquid penetrant tested according to ASME Code, Section III, Paragraphs NB-2545, NC-2545, or NB-2546, and NC-2546.~~
- ~~5. Wheel and shaft forgings shall be ultrasonically tested according to ASTM A-388.~~
- ~~6. Butt welds in forgings shall be radiographed and magnetic particle or liquid penetrant tested according to the ASME Boiler and Pressure Vessel Code, Section III Paragraph NB-2575, NC-2575, NB-2545, NC-2545, NB-2546, NC-2546 respectively. Acceptance standards shall be in accordance with ASME Boiler and Pressure Vessel Code Section III, Paragraph NB-5320, NC-5320, NB-5340, NC-5340, NB-5350, NC-5350, respectively.~~
- ~~7. Notification shall be made on major repairs and records maintained thereof.~~
- ~~8. Record system and traceability shall be according to ASME Section III, NCA-4000.~~
- ~~9. Quality control and identification shall be according to ASME Section III, NCA-4000.~~
- ~~10. Authorized inspection procedures shall conform to ASME Section III, NB-5100 and NC-5100.~~
- ~~11. Non-destructive examination personnel shall be qualified and certified according to ASME Section III, NB-5500 and NC-5500.~~

x. ~~The cranes and Safety Class-2 {3} fuel servicing equipment are designed to hold up their loads and to maintain their positions over the units under conditions of SSE.~~

ii. Watertight doors that protect safety-related equipment from the Design Basis Flood are designated as Seismic Category I.