2.0 Design Certification ITAAC

Design Certification ITAAC in this COLA are based on the ABWR design certification material contained in the reference ABWR DCD, Tier 1, Chapters 2 and 3. The total scope of the design certification material, including ITAAC, is provided in Tier 1 material in COLA Part 2. The Tier 1 ITAAC are incorporated by reference (IBR) with the exception of the ITAAC that are modified by the following departures.

STD DEP T1 2.2-1 (Table 2.2.1)

STD DEP T1 2.4-1 (Table 2.4.1)

STD DEP T1 2.4-3 (Table 2.4.4)

STD DEP T1 2.4-4

STP DEP T1 2.5-1

STD DEP T1 2.12-1 (Table 2.12.1, Table 2.12.12, Table 2.12.14, Table 2.12.15)

STD DEP T1 2.12-2 (Figure 2.12.15)

STD DEP T1 2.14-1 (Table 2.3.3, Table 2.14.8, Table 2.15.5.c)

STD DEP T1 3.4-1 (Table 2.2.11, Table 2.7.5, Table 3.4)

Tier 1 Subsection 2.2.1 Rod Control and Information System

Table 2.2.1 Rod Control and Information System

Inspections, Tests, Analyses and Acceptance Criteria		
Design Commitment	**Inspection, Tests, Analyses**	**Acceptance Criteria**
11. The RCIS is powered by two non-Class 1E uninterruptible **power** supplies, **such that both channels of the RCIS remain operational if either supply is operational with the non-operational supply in an alarmed condition**.	11. Tests will be performed on the as-built RCIS by ~~*providing a test signal in only one non- Class 1E uninterruptible power supply at a time.*~~**removing each power supply from service one at a time.**	11. ~~*The test signal exists in only one control channel at a time.*~~ **An alarm is activated by the inoperable power supply, and both channels of the RCIS remain operational.**

Tier 1 Subsection 2.2.11 ~~Process Computer System~~ Plant Computer Functions (PCFs)

Table 2.2.11 ~~Process Computer System~~ Plant Computer Functions

Inspections, Tests, Analyses and Acceptance Criteria		
Design Commitment	**Inspections, Tests, Analyses**	**Acceptance Criteria**
1. The **PICS** equipment ~~comprising~~ **performing** the ~~PCS~~ **PCFs** is defined in Section 2.2.11.	1. Inspections of the as-built system will be conducted.	1. The as-built ~~PCS~~ **equipment implementing the PCFs** conforms with the description in Section 2.2.11.
2. The ~~PCS~~ **PCFs** ~~provides~~ **provide** LPRM calibration and fuel operating thermal limits data to the ATLM function of the RCIS.	2. Tests of the as-built ~~PCS~~ **PCFs** will be conducted using simulated plant input signals.	2. LPRM calibration and fuel thermal limits data are received by the ATLM function of the RCIS.
3. In the event that abnormal conditions develop in the plant during operations in the automatic mode, the ~~PCS~~ **PCFs** automatically ~~reverts~~ **revert** to the manual operating mode.	3. Tests of the as-built ~~PCS~~ **PCFs** will be conducted using simulated abnormal plant input signals, while the ~~PCS~~ **PCFs** ~~is~~ **are** in the automatic operating mode.	3. Upon receipt of the abnormal plant input signals, the ~~PCS~~ **PCFs** automatically ~~reverts~~ **revert** to the manual operating mode.

Tier 1 Subsection 2.3.3 Containment Atmospheric Monitoring System

Table 2.3.3 Containment Atmospheric Monitoring System

Inspections, Tests, Analyses and Acceptance Criteria		
Design Commitment	**Inspections, Tests, Analyses**	**Acceptance Criteria**
2. Operation of ~~each~~ CAMS **oxygen/hydrogen monitoring equipment** ~~division~~ can be activated manually by the operator or automatically.	2. Tests ~~of each division~~ of the as-built CAMS **oxygen/hydrogen monitoring equipment** will be conducted using manual controls and simulated automatic initiation signals.	2. ~~Each~~ CAMS ~~division~~ **oxygen/hydrogen monitoring equipment** is activated upon receipt of the test signals.
3. **a.** Each CAMS division **of radiation channels** is powered **only** from its respective divisional Class 1E power source **with electrical independence between divisions**. **b.** In the CAMS, independence is provided between Class 1E divisions, and between Class 1E divisions and non-Class 1E equipment.	3. a. Tests will be performed on **each division** of the CAMS **radiation channels** by providing a test signal to only one Class 1E division at a time. b. Inspection of the as-built Class 1E **radiation channels** ~~divisions in the CAMs~~ will be performed.	3. a. The test signal exists only in the Class 1E division under test in the CAMS. b. In the CAMS, physical separation or electrical isolation exists between Class 1E divisions. Physical separation or electrical isolation exists between these Class 1E divisions and non-Class 1E equipment.

Tier 1 Subsection 2.4.1 Residual Heat Removal System

Table 2.4.1 Residual Heat Removal System

Inspections, Tests, Analyses and Acceptance Criteria		
Design Commitment	**Inspections, Tests, Analyses**	**Acceptance Criteria**
4. c. The RHR pumps have sufficient NPSH.	4. c. Inspections, tests and analyses will be performed upon the as-built RHR System. NPSH tests of the pumps will be performed in a test facility. The analyses will consider the effects of: – Pressure losses for pump inlet piping and components. – Suction from the suppression pool with water level at the minimum value. – ~~*50% blockage of pump suction strainers*~~ **Analytically derived values for blockage of pump suction strainers based upon the as-built system.** – Design basis fluid temperature (100°C) – Containment at atmospheric pressure.	4. c. The available NPSH exceeds the NPSH required by the pumps.

Table 2.4.1 Residual Heat Removal System (Continued)

Inspections, Tests, Analyses and Acceptance Criteria		
Design Commitment	**Inspections, Tests, Analyses**	**Acceptance Criteria**
7. In the augmented fuel pool cooling mode, the RHR tube side heat exchanger flow rate ~~*for Divisions B or C*~~ is no less than 350 m^3/h (heat exchanger heat removal capacity in this mode is bounded by suppression pool cooling requirements).	7. Tests will be performed to determine system flow rate through each heat exchanger in the augmented fuel pool cooling mode. Inspections and analyses shall be performed to verify that the augmented fuel pool cooling mode is bounded by suppression pool cooling requirements.	7. The RHR tube side heat exchanger flow rate is greater than or equal to 350 m^3/h in the augmented fuel pool cooling mode. Heat exchanger heat removal capacity in this mode is bounded by suppression pool cooling requirements.

Tier 1 Subsection 2.4.2 High Pressure Core Flooder System

Table 2.4.2 High Pressure Core Flooder System

Inspections, Tests, Analyses and Acceptance Criteria		
Design Commitment	**Inspections, Tests, Analyses**	**Acceptance Criteria**
3. g. The HPCF pumps have sufficient NPSH available at the pumps.	3. g. Inspections, tests and analyses will be performed upon the as-built system. NPSH tests of the pumps will be performed in a test facility. The analyses will consider the effects of: – Pressure losses for pump inlet piping and components. – Suction from the suppression pool with water level at the minimum value. – ~~*50% minimum blockage of pump suction strainers*~~ **Analytically derived values for blockage of pump suction strainers based upon the as-built system.** – Design basis fluid temperature (100°C) – Containment at atmospheric pressure.	3. g. The available NPSH exceeds the NPSH required by the pumps.

Tier 1 Subsection 2.4.4 Reactor Core Isolation Cooling System

Table 2.4.4 Reactor Core Isolation Cooling System

Inspections, Tests, Analyses and Acceptance Criteria		
Design Commitment	**Inspections, Tests, Analyses**	**Acceptance Criteria**
3. c. Following receipt of an initiation signal, the RCIC System automatically initiates and operates in the RPV water makeup mode.	3. c. Tests will be conducted on the RCIC System using simulated initiation signal.	3. c. Upon receipt of a simulated initiation signal, the following occurs: ~~*(1) Steam supply bypass valve receives open signal.*~~ ~~*(2)*~~**(1)** Test return valves receive close signal. ~~*(3)*~~**(2)** CST suction valve receives open signal. ~~*(4)*~~**(3)** Injection valve receives open signal .~~*after a 10-second delay.*~~ ~~*(5)*~~**(4)** Steam admission valve receives open signal. ~~*after a 10-second time delay.*~~
e. Following receipt of shutdown signal, the RCIC System automatically terminates the RPV water makeup mode.	e. Tests will be conducted on RCIC System using simulated shutdown signal.	e. Upon receipt of simulated shutdown signals, the following occurs: ~~*(1)Steam supply bypass valve receives close signal.*~~ ~~*(2)*~~**(1)** RCIC initiation logic resets. ~~*(3)*~~**(2)** Injection valve receives close signal. ~~*(4)*~~**(3)** Steam admission valve receives close signal.

Tier 1 Subsection 2.4.4 Reactor Core Isolation Cooling System

Table 2.4.4 Reactor Core Isolation Cooling System (Continued)

Inspections, Tests, Analyses and Acceptance Criteria		
Design Commitment	**Inspections, Tests, Analyses**	**Acceptance Criteria**
f. Following RCIC shutdown on high reactor water level signal, the RCIC System automatically restarts to provide RPV water makeup if low water level signal recurs.	f. Tests will be conducted using simulated low reactor water level signals.	f. Upon receipt of simulated low reactor water level signals, the following occurs: ~~(1) Steam supply bypass valve receives open signal.~~ ~~(2)~~**(1)** Test return valves receive close signal. ~~(3)~~**(2)** CST suction valve receives open signal. ~~(4)~~**(3)** Injection valve receives open signal. ~~after a 10 second delay.~~ ~~(5)~~**(4)** Steam admission valve receives open signal. ~~after a 10 second time delay.~~
i. In the RPV water makeup mode, the RCIC pump delivers a flow rate of at least 182 m^3/h against a maximum differential pressure (between the RPV and the pump suction) of 8.12 MPa.	i. Tests will be conducted in a test facility on the RCIC System pump and turbine.	i. (1) The RCIC pump delivers a flow rate of at least 182 m^3/h against a maximum differential pressure (between the RPV and the pump suction of 8.12 MPa. (2) The RCIC turbine delivers the speed ~~and torque~~ required by the pump at the above conditions.

Tier 1 Subsection 2.4.4 Reactor Core Isolation Cooling System

Table 2.4.4 Reactor Core Isolation Cooling System (Continued)

Inspections, Tests, Analyses and Acceptance Criteria		
Design Commitment	**Inspections, Tests, Analyses**	**Acceptance Criteria**
j. The RCIC System pump has sufficient NPSH.	j. Inspections, tests and analyses will be performed based upon the as-built system. NPSH tests of the pump will be performed at a test facility. The analyses will consider the effects of: (1) Pressure losses for pump inlet piping and components. (2) Suction from the suppression pool with water level at the minimum value. (3) ~~50% blockage of pump suction strainers~~ **Analytically derived values for blockage of pump suction strainers based upon the as-built system.** (4) Design basis fluid temperature (77°C) (5) Containment at atmospheric pressure.	j. The available NPSH exceeds the NPSH required by the pump.

Tier 1 Subsection 2.5.6 Fuel Storage Facility

Table 2.5.6 Fuel Storage Facility

Inspections, Tests, Analyses and Acceptance Criteria		
Design Commitment	**Inspections, Tests, Analyses**	**Acceptance Criteria**
1. The basic configuration of the ~~new and~~ spent fuel racks is described in Section 2.5.6.	1. Inspections of the as-built system will be conducted	1. The as-built ~~new and~~ spent fuel storage racks conform with the basic configuration described in Section 2.5.6
2. The ~~new and~~ spent fuel racks maintain a subcriticality of at least 5% Δk under dry or flooded conditions.	2. Analyses will be performed to determine the keff of the as-built ~~new and~~ spent fuel racks.	2. An analysis report exists which concludes that the ~~new and~~ spent fuel racks have a subcriticality of at least 5% Δk under dry or flooded conditions.
3. The rack arrangement prevents accidental insertion of fuel assemblies between adjacent racks.	3. Inspections of the as-built ~~new and~~ spent fuel racks will be performed	3. The rack arrangement prevents accidental insertion of fuel assemblies between adjacent racks.
4. The rack arrangement allows flow to prevent the water from exceeding 100°C.	4. An analysis of the as-built spent fuel rack will be performed to determine the maximum water temperature.	4. An analysis report exists which concludes that the rack arrangement allows flow to prevent the water from exceeding 100°C.

Tier 1 Subsection 2.7.5 ~~*Multiplexing System*~~ Data Communication

Table 2.7.5 ~~*Essential Multiplexing System*~~ Data Communication

Inspections, Tests, Analyses and Acceptance Criteria		
Design Commitment	**Inspections, Tests, Analyses**	**Acceptance Criteria**
1. The equipment ~~*comprising the Multiplexing System*~~ **providing the ECFs and NECFs** is defined in Section 2.7.5.	1. Inspection of the as-built ~~*EMS and NEMS*~~ **equipment implementing the ECFs and the NECFs** will be conducted.	1. The as-built ~~*EMS and NEMS conform*~~ **equipment implementing the ECFs and NECFs conforms** with the description in Section 2.7.5.
2. ~~*EMS*~~ **The ECFs** ~~*uses*~~ **use** ~~*a*~~ deterministic communications ~~*protocol*~~ **protocols.**	2. Tests of the ~~*EMS*~~ **ECFs** communications ~~*protocol*~~ **protocols** will be conducted in a test facility.	2. ~~*EMS*~~ **The ECFs** ~~*uses*~~ **use** a deterministic communications ~~*protocol*~~ **protocols**.
3. Data communications from ~~*EMS*~~ **equipment implementing the ECFs** to non-safety-related systems or devices ~~uses~~ **use** an isolating transmission medium and buffering devices. Data cannot be transmitted from the non-safety-related side to ~~*EMS*~~ **equipment implementing the ECFs.**	3. Tests on the ~~*EMS*~~ **ECFs** ~~*data communications*~~ will be conducted in a test facility.	3. ~~*EMS communications*~~ **Equipment implementing the ECFs** only permits data transfer from the ~~*EMS*~~ **safety-related** to the non-safety-related systems or devices. **Control** or timing signals are not exchanged between ~~*EMS*~~ **safety-related** and non-safety-related systems or devices.

Tier 1 Subsection 2.7.5 ~~*Multiplexing System*~~ Data Communication

Table 2.7.5 ~~*Essential Multiplexing System*~~ Data Communication (Continued)

Inspections, Tests, Analyses and Acceptance Criteria		
Design Commitment	**Inspections, Tests, Analyses**	**Acceptance Criteria**
4. ~~*The EMS* **Equipment implementing the ECFs** features automatic self-test and automatically *reconfigures after detecting* **accommodates single** failure *of one channel* (either a cable break or device failure) within a division. The *system returns to* **ECFs continue** normal *operation* **function** after *reconfiguration* **the error is detected** with no interruption of data communication~~**The ECFs utilize self-diagnostics to detect a transmission path or communication module failure. The ECFs for remote units within a division accommodate a single failure (either a cable break or communication module failure), and will contiue to function with no interruption in data communication.**	4. ~~Tests will be conducted on each as-built *EMS* division **of equipment implementing the ECFs** by individually simulating the following, while simultaneously transmitting and monitoring test data streams:~~ ~~a. a.Single cable break.~~ ~~b. b.Loss of one *RMU* **local area cabinet implementing the ECFs.**~~ ~~c. c.Loss of one *CMU* **control area cabinet implementing the ECFs.**~~ **Tests will be conducted on all as built ECFs for remote units within a division simulating the following while transmitting and monitoring test data streams.** **a. Single cable break** **b. Loss of a communication module, such as a fiber optic modem**	4. There is **a valid system response generated for each test with** no loss of ~~*EMS*~~ **essential** data communication as a result of the fault. Fault occurrence is **identified by the system self-diagnostics and** displayed in the main control room.

Tier 1 Subsection 2.7.5 ~~*Multiplexing System*~~ Data Communication

Table 2.7.5 ~~*Essential Multiplexing System*~~ Data Communication (Continued)

Inspections, Tests, Analyses and Acceptance Criteria		
Design Commitment	**Inspections, Tests, Analyses**	**Acceptance Criteria**
5. Loss of data communications in a division of ~~*EMS*~~ **equipment implementing the ECFs** does not cause transient or erroneous data to occur at system outputs.	5. Tests will be performed in one division of ~~*EMS*~~ **equipment implementing the ECFs** at a time. While simulated input signals are being transmitted cable segments in redundant paths will be disconnected and ~~*EMS*~~ **the ECFs** outputs monitored.	5. Data communication is lost without generation of transient or erroneous signals.
6. Each of four ~~*EMS*~~ divisions **of equipment implementing the ECFs** is powered from its respective division's **uniterruptible** Class 1E ~~DC division~~ ~~*vital AC*~~ power. ~~*In the EMS*~~ **For the ECFs**, independence is provided between Class 1E divisions, and between Class 1E divisions and non-Class 1E equipment.	6. a. Tests will be performed on ~~*EMS*~~ **equipment implementing the ECFs** by providing a test signal in only one Class 1E division at a time. b. Inspection of the as-installed Class 1E divisions ~~*in the EMS*~~ will be performed.	6. a. The test signal exists only in the Class 1E division under test in the ~~*EMS*~~ **equipment implementing the ECFs**. b. ~~*In the EMS*~~ **For equipment implementing the ECFs,** physical separation or electrical isolation exists between Class 1E divisions. Physical separation or electrical isolation exists between these Class 1E divisions and non-Class 1E equipment.
7. Main control room alarms and displays provided for the ~~*EMS*~~ **ECFs** are as defined in Section 2.7.5.	7. Inspections will be performed on the main control room alarms and displays for the ~~*EMS*~~ **ECFs**.	7. Alarms and displays exist or can be retrieved in the main control room as defined in Section 2.7.5.

Tier 1 Subsection 2.12.1 Electrical Power Distribution System

Table 2.12.1 Electric Power Distribution System

Inspections, Tests, Analyses and Acceptance Criteria		
Design Commitment	**Inspections, Tests, Analyses**	**Acceptance Criteria**
11. EPD System interrupting devices (circuit breakers and fuses) are coordinated **to the maximum extent possible,** so that the circuit interrupter closest to the fault opens before other devices.	11. Analyses for the as-built EPD System to determine circuit interrupting device coordination will be performed.	11. Analyses for the as-built EPD System exist and conclude that**, to the maximum extent possible,** the analyzed circuit interrupter closest to the fault will open before other devices. For instances where coordination cannot be practically achieved, the analysis will justify the lack of coordination.
22. The EPD System supplies an operating voltage at the terminals of the Class 1E utilization equipment that is within the utilization equipment's voltage tolerance limits.	22. a. Analyses for the as-built EPD System to determine voltage drops will be performed. ~~*b. Tests of the as-built Class 1E EPD System will be conducted by operating connected Class 1E loads at their analyzed minimum voltage.*~~ **b. Type tests at manufacturer's shop will be performed for the operating voltage range of the Class 1E electrical equipment.**	22. a. Analyses for the as-built EPD System exist and conclude that the analyzed operating voltage supplied at the terminals of the Class 1E utilization equipment is within the utilization equipment's voltage tolerance limits, as determined by their nameplate ratings. ~~*b. Connected Class 1E loads operate at their analyzed minimum voltage, as determined by the voltage drop analyses.*~~ **b. Manufacturer's type test reports exist and conclude that the operating range is within the tested voltage range for the Class 1E electrical equipment.**

Table 2.12.1 Electric Power Distribution System

Inspections, Tests, Analyses and Acceptance Criteria		
Design Commitment	**Inspections, Tests, Analyses**	**Acceptance Criteria**
	c. System preoperational tests will be conducted of the as-built Class 1E EPD System.	c. The test voltages from preoperational test reports are compared against system voltage analysis of the as-built Class 1E EPD system. The results of comparison conclude that the available voltage is within the operating range for the as-installed equipment.

Tier 1 Subsection 2.12.12 Direct Current Power Supply

Table 2.12.12 Direct Current Power Supply

Inspections, Tests, Analyses and Acceptance Criteria		
Design Commitment	**Inspections, Tests, Analyses**	**Acceptance Criteria**
8. Class 1E DC electrical distribution system circuit interrupting devices (circuit breakers and fuses) are coordinated **to the maximum extent possible,** so that the circuit interrupter closest to the fault opens before other devices.	8. Analyses for the as-built Class 1E DC electrical distribution system to determine circuit interrupting device coordination will be performed.	8. Analyses for the as-built Class 1E DC electrical distribution system circuit interrupting devices exist and conclude that**, to the maximum extent possible,** the analyzed circuit interrupter closest to the fault will open before other devices. For instances where coordination cannot be practically achieved, the analysis will justify the lack of coordination.

Tier 1 Subsection 2.12.12 Direct Current Power Supply

Table 2.12.12 Direct Current Power Supply (Continued)

Inspections, Tests, Analyses and Acceptance Criteria		
Design Commitment	**Inspections, Tests, Analyses**	**Acceptance Criteria**
11. The Class 1E DC electrical distribution system supplies an operating voltage at the terminals of the Class 1E utilization equipment that is within the utilization equipment's voltage tolerance limits.	11.	11.
	a. Analyses for the as-built Class 1E DC electrical distribution system to determine system voltage drops will be performed.	a. Analyses for the as-built Class 1E DC electrical distribution system exist and conclude that the analyzed operating voltage supplied at the terminals of the Class 1E utilization equipment is within the utilization equipment's voltage tolerance limits, as determined by their nameplate ratings.
	~~b. Tests of the as-built Class 1E DC system will be conducted by operating connected Class 1E loads at less than or equal to the minimum allowable battery voltage and at greater than or equal to the maximum battery charging voltage.~~	~~b. Connected as-built Class 1E loads operate at less than or equal to the minimum allowable battery voltage and at greater than or equal to the maximum battery charging voltage.~~
	b. Type tests at manufacturer's shop will be performed for the operating voltage range of the Class 1E DC electrical equipment.	**b. Manufacturer's type test reports exist and conclude that the operating range is within the tested voltage range for the Class 1E DC electrical equipment.**
	c. System preoperational tests will be conducted on the as-built Class 1E DC system.	**c. The test voltages from preoperational test reports are compared against system voltage analysis of the as-built Class 1E EPD system. The results of comparison conclude that the available voltage is within the operating range for the as-installed DC equipment.**

Tier 1 Subsection 2.12.14 Vital AC Power Supply

Table 2.12.14 Vital AC Power Supply

Inspections, Tests, Analyses and Acceptance Criteria		
Design Commitment	**Inspections, Tests, Analyses**	**Acceptance Criteria**
10. Class 1E Vital AC Power Supply system interrupting devices (circuit breakers and fuses) are coordinated **to the maximum extent possible,** so that the circuit interrupter closest to the fault opens before other devices.	10. Analyses for the as-built Class 1E distribution system to determine circuit interrupting device coordination will be performed.	10. Analyses for the as-built Class 1E Vital AC Power Supply system circuit interrupting devices (circuit breakers and fuses) coordination exist and conclude that**, to the maximum extent possible,** the analyzed circuit interrupter closest to the fault will open before other devices. For instances where coordination cannot be practically achieved, the analysis will justify the lack of coordination.

Tier 1 Subsection 2.12.15 Instrument and Control Power Supply

Table 2.12.15 Instrument and Control Power Supply

Inspections, Tests, Analyses and Acceptance Criteria		
Design Commitment	**Inspections, Tests, Analyses**	**Acceptance Criteria**
9. Class 1E Instrument and Control Power Supply system interrupting devices (circuit breakers and fuses) are coordinated **to the maximum extent possible,** so that the circuit interrupter closest the fault opens before other devices.	9. Analyses for the as-built Class 1E distribution system to determine circuit interrupting device coordination will be performed.	9. Analyses for the as-built Class 1E Instrument and Control Power Supply system circuit interrupting devices (circuit breakers and fuses) coordination exist and conclude that**, to the maximum extent possible,** the analyzed circuit interrupter closest to the fault will open before other devices. For instances where coordination cannot be practically achieved, the analysis will justify the lack of coordination.

Tier 1 Subsection 2.14.8 Flammability Control System(Not Used)

Table 2.14-8 Flammability Control System

Design Commitment	Inspections, Tests, Analyses and Acceptance Criteria Inspections, Tests, Analyses	Acceptance Criteria
1. The basic configuration for the FCS is as shown on Figure 2.14.8.	1. Inspections of the as-built system will be conducted.	1. The as-built FCS conforms with the basic configuration shown on Figure 2.14.8.
2. The ASME Code components of the FCS retain their pressure boundary integrity under internal pressures that will be experienced during service.	2. A pressure test will be conducted on those Code components of the FCS required to be pressure tested by the ASME code.	2. The results of the pressure test of the ASME code components of the FCS conform with the requirements in the ASME Code, Section III.
3. Each of the two FCS divisions is powered from the respective Class 1E division as shown on Figure 2.14.8. In the FCS, independence is provided between Class 1E divisions, and between Class 1E divisions and non-Class 1E equipment.	3. a. Tests will be performed in the FCS by providing a test signal in only one Class 1E division at a time. b. Inspection of the as-installed Class 1E divisions in the FCS will be performed.	3. a. The test signal exists only in the Class 1E division under test in the FCS. b. Physical separation or electrical isolation exists between Class 1E divisions in the FCS. Physical separation or electrical isolation exists between Class 1E divisions and non-Class 1E equipment in the FCS.
4. Each mechanical division of the FCS (Divisions B, C) is physically separated from the other divisions.	4. Inspections of the as-built FCS will be conducted.	4. Each mechanical division of the FCS is physically separated from the other mechanical divisions of FCS by structural and/or fire barriers.
5. Main control room displays and controls provided for the FCS are as defined in Section 2.14.8.	5. Inspections will be performed on the main control room displays and controls for the FCS.	5. Displays and controls exist or can be retrieved in the main control room as defined in Section 2.14.8.
6. RSS display and control provided for the FCS are as defined in Section 2.14.8.	6. Inspections will be performed on the RSS display and control for the FCS.	6. Display and control exists on the RSS as defined in Section 2.14.8.
7. MOVs designated in Section 2.14.8 as having an active safety-related function open and close under differential pressure and fluid flow and temperature conditions.	7. Tests of installed valves for both opening and closing will be conducted under preoperational differential pressure, fluid flow, and temperature conditions.	7. Upon receipt of the actuating signal, each MOV both opens and closes, depending on the valve's safety function.

~~Table 2.14-8 Flammability Control System~~

~~Design Commitment~~	~~Inspections, Tests, Analyses and Acceptance Criteria~~ ~~Inspections, Tests, Analyses~~	~~Acceptance Criteria~~
~~8. CVs designated in Section 2.14.8 as having an active safety-related function open and close under system pressure, fluid flow, and temperature conditions.~~	~~8. Tests of installed valves for both opening and closing will be conducted under preoperational system pressure, fluid flow, and temperature conditions.~~	~~8. Based on the direction of the differential pressure across the valve, each CV opens or closes depending upon the valve's safety functions.~~
~~9. The pneumatic valves shown on Figure 2.14.8 fail close in the event of loss of pneumatic pressure or loss of electrical power to the valve actuating solenoid.~~	~~9. Tests will be conducted on the as-built FCS pneumatic valves.~~	~~9. The pneumatic valves shown on Figure 2.14.8 fail close in the event of loss of pneumatic pressure or loss of electrical power to the valve actuating solenoid.~~

Tier 1 Subsection 2.15.5 Heating, Ventilating and Air Conditioning Systems

Table 2.15-5c Reactor Building Safety-Related Equipment HVAC System

Inspections, Tests, Analyses and Acceptance Criteria		
Design Commitment	**Inspections, Tests, Analyses**	**Acceptance Criteria**
*4. ~~The FCS room FCUs are initiated upon a manual FCS start signal.~~*Not used.	*4. ~~Tests will be conducted on each as built FCS room FCU using a simulated intitiation signal.~~*Not used.	*4.~~.The FCS room FCU starts upon receipt of a signal indicating FCS start.~~*Not used.

Table 3.4 Instrumentation and Control

Inspections, Tests, Analyses and Acceptance Criteria		
Design Commitment	**Inspections, Tests, Analyses**	**Acceptance Criteria**
Safety System Logic and Control		
3. The ~~DTM, TLU~~ **equipment implementing the DTF, TLF,** and OLUs for RPS and MSIV in each of the four instrumentation divisions are powered from their respective divisional Class 1E AC sources. The ~~DTMs and SLUs~~ **equipment implementing the DTF and SLF for** ESF ~~1 and ESF 2~~ in Divisions I, II, and III are powered from their respective divisional Class 1E DC sources, as ~~are~~ **is** the **equipment implementing the** ESF ~~DTMs~~ **DTF** in Division IV. In SSLC, independence is provided between Class 1E divisions and between Class 1E divisions and non-Class 1E equipment.	3. a. Tests will be performed on SSLC-by providing a test signal to the I&C equipment in only one Class 1E division at a time. b. Inspection of the as-installed Class 1E divisions in SSLC will be performed.	3. a. The test signal exists only in the Class 1E division under test in SSLC. b. In SSLC, physical separation or electrical isolation exists between Class 1E divisions. Physical separation or electrical isolation exists between these Class 1E divisions and non-Class 1E equipment.
4. SSLC provides the following bypass functions: a. Division-of-sensors bypass b. Trip logic output bypass c. ESF output channel bypass**, where applied**	4. Tests will be performed on the as-built SSLC as follows: a(1) Place one division of sensors in bypass. Apply a trip test signal in place of each sensed parameter that is bypassed. At the same time, apply a redundant trip signal for each parameter in each other division, one division at a time. Monitor the voted trip output ~~at~~ **from** each ~~TLU and SLU~~ **equipment component that implements a TLF or SLF**. Repeat for each division.	4. Results of bypass tests are as follows: a(1) No trip change occurs at the voted trip output ~~of~~ **from** each ~~TLU and SLU~~ **equipment component that implements a TLF or SLF**. Bypass status is indicated in main control room.

Table 3.4 Instrumentation and Control (Continued)

Inspections, Tests, Analyses and Acceptance Criteria		
Design Commitment	**Inspections, Tests, Analyses**	**Acceptance Criteria**
4. (continued)	4. (continued) a(2) For each division in bypass, attempt to place each other division in division-of-sensors bypass, one at a time. b(1) Place one division in trip-logic-output bypass. Operate manual auto-trip test switch. Monitor the trip output at the RPS OLU. Operate manual auto-isolation test switch. Monitor the trip output at the MSIV OLU. Repeat for each division. b(2) For each division in bypass, attempt to place the other divisions in trip-logic-output bypass, one at a time. c(1) Apply common test signal to any one pair of ~~dual SLU~~ **redundant SLF** signal inputs. Monitor test signal at ~~voted 2-out-of-2~~ output ~~in RMU area~~ **from equipment performing the ECF in local areas**. Remove power from **equipment performing** one ~~SLU~~ **SLF**, restore power, then remove power from **equipment performing** other ~~SLU~~ **SLF**. Repeat test for all pairs of ~~dual SLUs~~ **redundant sets of equipment implementing a SLF** in each division.	4. (continued) a(2) Each division not bypassed cannot be placed in bypass, as indicated at OLU output; bypass status in main control room indicates only one division of sensors is bypassed. b(1) No trip change occurs at the trip output of the RPS OLU or MSIV OLU, respectively. Bypass status is indicated in main control room. b(2) Each division not bypassed cannot be placed in bypass, as indicated at OLU output; bypass status in main control room indicates only one trip logic output is bypassed. c(1) Monitored test output signal does not ~~change state~~ **initiate the system function** when power is removed from ~~either SLU~~ **the equipment performing any single SLF**. Bypass status and loss of power to ~~SLU~~ **equipment performing the SLF** are indicated in main control room.

Table 3.4 Instrumentation and Control (Continued)

Inspections, Tests, Analyses and Acceptance Criteria		
Design Commitment	**Inspections, Tests, Analyses**	**Acceptance Criteria**
4. (continued)	4. (continued) *c(2) Disable auto-bypass circuit in bypass unit. Repeat test c(1), but operate manual ESF loop bypass switch for each affected loop.*	4. (continued) *c(2) Monitored test output signal is lost when power is removed from either* **SLU**, *but is restored when manual bypass switch is operated. Bypass status, auto-bypass inoperable, and loss of power to* **SLU** *are indicated in main control room.*

Table 3.4 Instrumentation and Control (Continued)

<table>
<tr><th colspan="3">Inspections, Tests, Analyses and Acceptance Criteria</th></tr>
<tr><th>Design Commitment</th><th>Inspections, Tests, Analyses</th><th>Acceptance Criteria</th></tr>
<tr><td colspan="3">Electromagnetic Compatibility</td></tr>
<tr><td>12. Electrical and electronic components in the systems listed below are qualified for the anticipated levels of electrical interference at the installed locations of the components according to an established plan:
a. Safety System Logic and Control
b. <s>Essential Multiplexing System</s>Equipment performing the Essential Communication Function (ECF)
c. <s>Non-Essential Multiplexing System</s> Equipment performing the Non Essential Communication Function (NECF)
d. Other microprocessor-based, software controlled systems or equipment
The plan is structured on the basis that electromagnetic compatibility (EMC) of I&C equipment is verified by factory testing and site testing of both individual components and interconnected systems to meet EMC requirements for protection against the effects of:
a. Electromagnetic Interference (EMI)
b. Radio Frequency Interference (RFI)
c. Electrostatic Discharge (ESD)
d. Electrical surge [Surge Withstand Capability (SWC)]</td><td>12. The EMC compliance plan will be reviewed.</td><td>12. An EMC compliance plan is in place. The plan requires, for each system qualified, system documentation that includes confirmation of component and system testing for the effects of high electrical field conditions and current surges. As a minimum, the following information is documented in a qualification file and subject to audit:
a. Expected performance under test conditions for which normal system operation is to be ensured.
b. Normal electrical field conditions at the locations where the equipment must perform as above.
c. Testing methods used to qualify the equipment, including:
(1.) Types of test equipment.
(2.) Range of normal test conditions.
(3.) Range of abnormal test conditions for expected transient environment.</td></tr>
</table>

Table 3.4 Instrumentation and Control (Continued)

Inspections, Tests, Analyses and Acceptance Criteria		
Design Commitment	**Inspections, Tests, Analyses**	**Acceptance Criteria**
13. Setpoints for initiation of safety-related functions are determined, documented, installed and maintained using a process that establishes a plan for: a. Specifying requirements for documenting the bases for selection of trip setpoints. b. Accounting for instrument inaccuracies, uncertainties, and drift. c. Testing of instrumentation setpoint dynamic response. d. Replacement of setpoint-related instrumentation. The setpoint methodology plan requires that activities related to instrument setpoints be documented and stored in retrievable, auditable files.	13. Inspections will be performed of the setpoint methodology plan used to determine, document, install, and maintain instrument setpoints.	*13. The setpoint methodology plan is in place. The plan generates requirements for:* a. Documentation of data, assumptions, and methods used in the bases for selection of trip setpoints. b. Consideration of instrument channel inaccuracies (including those due to analog-to-digital converters, signal conditioners, **and** temperature compensation circuits, ~~*and multiplexing and demultiplexing components)*~~, instrument calibration uncertainties, instrument drift, and uncertainties due to environmental conditions (temperature, humidity, pressure, radiation, EMI, power supply variation), measurement errors, and the effect of design basis event transients are included in determining the margin between the trip setpoint and the safety limit. c. The methods used for combining uncertainties. Use of written procedures for preoperational testing and tests performed to satisfy the Technical Specifications. e. Documented evaluation of replacement instrumentation which is not identical to the original equipment.