2.4.11 Boron Concentration Measurement System

1.0 Description

The boron concentration measurement system (BCMS) measures the boron concentration in the chemical and volume control system (CVCS).

The BCMS has the following safety-related function:

- Sends boron concentration measurement signals to the signal conditioning and distribution system (SCDS).

2.0 Arrangement

2.1 The BCMS equipment is located as listed in Table 2.4.11–1—Boron Concentration Measurement System Equipment.

3.0 Mechanical Design Features

3.1 Equipment identified as Seismic Category I in Table 2.4.11-1 can withstand seismic design basis loads without loss of safety function.

4.0 I&C Design Features, Displays and Controls

4.1 The BCMS provides output signals listed in Table 2.4.11-2—Boron Concentration Measurement System Output Signals.

4.2 The BCMS equipment classified as Class 1E in Table 2.4.11-1 can perform its safety function when subjected to electromagnetic interference (EMI), radio-frequency interference (RFI), electrostatic discharges (ESD), and power surges.

5.0 Electrical Power Design Features

5.1 The components identified as Class1E in Table 2.4.11-1 are powered from the Class 1E division as listed in Table 2.4.11-1 in a normal or alternate feed condition.

6.0 System Inspections, Tests, Analyses, and Acceptance Criteria

Table 2.4.11-3 lists the BCMS ITAAC.

Table 2.4.11-1—Boron Concentration Measurement System Equipment

Description	Tag Number (1)	Location	Seismic Category	IEEE Class 1E (2)
Boron Concentration Sensor Division 1	30KBA34CQ857A	Fuel Building	I	1^N 2^A
Boron Concentration Sensor Division 2	30KBA34CQ857B	Fuel Building	I	2^N 1^A
Boron Concentration Sensor Division 3	30KBA34CQ858B	Fuel Building	I	3^N 4^A
Boron Concentration Sensor Division 4	30KBA34CQ858A	Fuel Building	I	4^N 3^A
Temperature Sensor Division 1	30KBA34CT857A	Fuel Building	I	1^N 2^A
Temperature Sensor Division 2	30KBA34CT857B	Fuel Building	I	2^N 1^A
Temperature Sensor Division 3	30KBA34CT858B	Fuel Building	I	3^N 4^A
Temperature Sensor Division 4	30KBA34CT858A	Fuel Building	I	4^N 3^A
Boron Concentration Measurement Conditioning Cabinets Division 1	30CLE23	Safeguard Building 1	I	1^N 2^A
Boron Concentration Measurement Conditioning Cabinets Division 2	30CLF23	Safeguard Building 2	I	2^N 1^A
Boron Concentration Measurement Conditioning Cabinets Division 3	30CLG23	Safeguard Building 3	I	3^N 4^A
Boron Concentration Measurement Conditioning Cabinets Division 4	30CLH23	Safeguard Building 4	I	4^N 3^A

1) Equipment tag numbers are provided for information and are not part of the design certification.

2) ^{N} denotes the division the component is normally powered from. ^{A} denotes the division the component is powered from when alternate feed is implemented.

Table 2.4.11-2—Boron Concentration Measurement System Output Signals

Item #	Output Signal	Recipient	# Divisions
1	Boron Concentration Measurement	SCDS	4

Table 2.4.11-3—Boron Concentration Measurement System ITAAC (2 Sheets)

Commitment Wording		Inspections, Tests, Analyses	Acceptance Criteria
2.1	The BCMS equipment is located as listed in Table 2.4.11–1.	Inspections will be performed of the location of the BCMS equipment.	The equipment listed in Table 2.4.11-1 is located as listed in Table 2.4.11-1.
3.1	Equipment identified as Seismic Category I in Table 2.4.11-1 can withstand seismic design basis loads without loss of safety function.	a. Type tests, analyses or a combination of type tests and analyses will be performed on the equipment listed as Seismic Category I in Table 2.4.11-1 using analytical assumptions, or under conditions, which bound the Seismic Category I design requirements. b. Inspections will be performed of the Seismic Category I equipment listed in Table 2.4.11-1 to verify that the equipment including anchorage is installed as specified on the construction drawings.	a. Tests/analysis reports exist and conclude that the equipment listed as Seismic Category I in Table 2.4.11-1 can withstand seismic design basis loads without loss of safety function. b. Inspection reports exist and conclude that the Seismic Category I equipment listed in Table 2.4.11-1 including anchorage is installed as specified on the construction drawings.
4.1	The BCMS provides output signals listed in Table 2.4.11-2.	Tests will be performed to verify the existence of output signals.	The BCMS provides output signals to the recipients listed in Table 2.4.11-2.
4.2	The BCMS equipment classified as Class 1E in Table 2.4.11-1 can perform its safety function when subjected to EMI, RFI, ESD, and power surges.	Type tests or type tests and analysis of these will be performed for the Class 1E equipment listed in Table 2.4.11-1.	A report exists and concludes that the equipment listed as Class 1E in Table 2.4.11-1 can perform its safety function when subjected to EMI, RFI, ESD, and power surges.

Table 2.4.11-3—Boron Concentration Measurement System ITAAC (2 Sheets)

Commitment Wording		Inspections, Tests, Analyses	Acceptance Criteria
5.1	The components identified as Class1E in Table 2.4.11-1 are powered from the Class 1E division as listed in Table 2.4.11-1 in a normal or alternate feed condition.	a. Testing will be performed for components identified as Class 1E in Table 2.4.11-1 by providing a test signal in each normally aligned division. b. Testing will be performed for components identified as Class 1E in Table 2.4.11-1 by providing a test signal in each division with the alternate feed aligned to the divisional pair.	a. The test signal provided in the normally aligned division is present at the respective Class 1E components identified in Table 2.4.11-1. b. The test signal provided in each division with the alternate feed aligned to the divisional pair is present at the respective Class 1E components identified in Table 2.4.11-1.

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