2.4.2 Safety Information and Control System

1.0 Description

The safety information and control system (SICS) provides the human-machine interface (HMI) means to perform control and information functions needed to monitor the plant safety status and bring the unit to and maintain it in a safe shutdown state in case of the inoperability of the process information and control system (PICS).

In case of the unavailability of the PICS, the SICS provides the following safety related functions:

- Manual actuation of reactor trip in the main control room (MCR) and remote shutdown station (RSS).
- Manual actuation of engineered safety features (MCR only).
- Monitoring and control of systems required to achieve and maintain safe shutdown (MCR and RSS).
- Display of Type A through Type C post-accident monitoring variables (MCR only).

2.0 Arrangement

2.1 The location of the SICS equipment is as listed in Table 2.4.2-1—Safety Information and Control System Equipment.

2.2 Deleted

3.0 Mechanical Design Features

3.1 Equipment identified as Seismic Category I in Table 2.4.2-1 can withstand seismic design basis loads without loss of safety function.

4.0 I&C Design Features, Displays and Controls

4.1 The capability to transfer control of the SICS from the MCR to the RSS exists.

4.2 Deleted.

4.3 Electrical isolation is provided on connections between the safety related parts of the SICS and the non safety I&C systems.

4.4 The SICS equipment classified as Class 1E in Table 2.4.2-1 can perform its safety function when subjected to electromagnetic interference (EMI), radio-frequency interference (RFI), electrostatic discharges (ESD), and power surges.

4.5 The SICS hardware and software are developed using a design process composed of five life cycle phases with each phase having design outputs which must conform to the requirements of that phase. The five life cycle phases are the following:

1. Basic design phase.
2. Detailed design phase.
3. Manufacturing phase.
4. Testing phase.
5. Installation and commissioning phase.

4.6 Electrical isolation is provided between the RSS and the MCR for the SICS.

5.0 Electrical Power Design Features

5.1 The components identified as Class 1E in Table 2.4.2-1 are powered from the Class 1E division as listed in Table 2.4.2-1 in a normal or alternate feed condition.

6.0 System Inspections, Tests, Analyses, and Acceptance Criteria

Table 2.4.2-2 lists the SICS ITAAC.

Table 2.4.2-1—Safety Information and Control System Equipment (2 Sheets)

Equipment Description	Equipment Tag Number (1)	Equipment Location	Seismic Category	IEEE Class 1E (2)
SICS Cabinets, Division 1	30CWY1	Safeguard Building 1	I	1^N 2^A
SICS Cabinets, Division 2	30CWY2	Safeguard Building 2	I	2^N 1^A
SICS Cabinets, Division 3	30CWY3	Safeguard Building 3	I	3^N 4^A
SICS Cabinets, Division 4	30CWY4	Safeguard Building 4	I	4^N 3^A
SICS QDS Units MCR for safety related I&C functions	N/A	MCR	I	1^N 2^A
SICS QDS Units MCR for safety related I&C functions, Division 2	N/A	MCR	I	2^N 1^A
SICS QDS Units MCR for safety related I&C functions, Division 3	N/A	MCR	I	3^N 4^A
SICS QDS Units MCR for safety related I&C functions, Division 4	N/A	MCR	I	4^N 3^A
SICS QDS Units MCR for non-safety related I&C functions	N/A	MCR	N/A	No
SICS QDS Units RSS Division 1	N/A	RSS	I	1^N 2^A
SICS QDS Units RSS Division 2	N/A	RSS	I	2^N 1^A
SICS QDS Units RSS Division 3	N/A	RSS	I	3^N 4^A
SICS QDS Units RSS Division 4	N/A	RSS	I	4^N 3^A
Hardwired (Conventional) I&C Division 1	N/A	MCR, RSS	I	1^N 2^A
Hardwired (Conventional) I&C Division 2	N/A	MCR, RSS	I	2^N 1^A
Hardwired (Conventional) I&C Division 3	N/A	MCR, RSS	I	3^N 4^A

Table 2.4.2-1—Safety Information and Control System Equipment (2 Sheets)

Equipment Description	Equipment Tag Number (1)	Equipment Location	Seismic Category	IEEE Class 1E (2)
Hardwired (Conventional) I&C Division 4	N/A	MCR, RSS	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 2.4.2-2—Safety Information and Control System ITAAC (4 Sheets)

Commitment Wording		Inspections, Tests, Analyses	Acceptance Criteria
2.1	The location of the SICS equipment is as listed in Table 2.4.2-1.	Inspection will be performed of the location of the equipment.	The equipment listed in Table 2.4.2-1 is located as listed in Table 2.4.2-1.
2.2	Deleted.	Deleted.	Deleted..
3.1	Equipment identified as Seismic Category I in Table 2.4.2-1can 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 2.4.1-1 using analytical assumptions, or under conditions, which bound the Seismic Category I design requirements. b. Inspections will be performed of the as-installed Seismic Category I equipment listed in Table 2.4.2-1 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 2.4.1-1 can withstand seismic design basis loads without loss of safety function. b. Inspection reports exist and conclude that the as-installed Seismic Category I equipment listed in Table 2.4.2-1 including anchorage is installed as specified on the construction drawings.
4.1	The capability to transfer control of the SICS from the MCR to the RSS exists.	a. Inspections will be performed to verify the existence of procedures. b. Tests will be performed to verify that control of the SICS can be transferred from the MCR to the RSS.	a. A report exists and concludes that procedures exist for transfer of control of the SICS from the MCR to the RSS. b. A report exists and concludes that the test results confirm that control of the SICS can be transferred from the MCR to the RSS.
4.2	Deleted.	Deleted.	Deleted.

Table 2.4.2-2—Safety Information and Control System ITAAC (4 Sheets)

Commitment Wording		Inspections, Tests, Analyses	Acceptance Criteria
4.3	Electrical isolation is provided on connections between the safety related parts of the SICS and the non safety I&C systems.	a. Analyses will be performed to determine the test specification for electrical isolation devices on connections between the safety related parts of the SICS and the non safety I&C systems.	a. A test plan exists that provides the test specification for determining whether a device is capable of preventing the propagation of credible electrical faults on connections between the safety related parts of the SICS and the non safety I&C systems.
		b. Type tests, analyses, or a combination of type tests and analyses will be performed on the electrical isolation devices between the safety related parts of the SICS and the non safety I&C systems.	b. A report exists and concludes that the Class 1E isolation devices used between the safety related parts of the SICS and the non safety I&C systems prevent the propagation of credible electrical faults.
		c. Inspections will be performed on all connections between the safety related parts of the SICS and the non safety I&C systems.	c. Class 1E electrical isolation devices exist on all connections between the safety related parts of the SICS and the non safety I&C systems.
4.4	The SICS equipment listed as Class 1E in Table 2.4.2-1 can perform its safety function when subjected to EMI, RFI, ESD, and power surges.	Type tests, tests, analyses or a combination of these will be performed for the Class 1E equipment listed in Table 2.4.1-1.	A report exists and concludes that the equipment listed as Class 1E in Table 2.4.2-1 can perform its safety function when subjected to EMI, RFI, ESD, and power surges.
4.5	The SICS hardware and software are developed using a design process composed of five life cycle phases with each phase having design outputs which must conform to the requirements of that phase. The five life cycle phases are the following: 1) Basic design phase.	a. Inspections will be performed to verify that the SICS basic design phase process has design outputs.	a. A report exists and provides the design outputs for the basic design phase of the SICS hardware and software design process.
		b. Analyses will be performed to verify that the design outputs for the SICS basic design phase conform to the requirements of that phase.	b. A verification and validation (V&V) report exists and concludes that the design outputs conform to the requirements of the SICS basic design phase.

Table 2.4.2-2—Safety Information and Control System ITAAC (4 Sheets)

	Commitment Wording	Inspections, Tests, Analyses	Acceptance Criteria
	2) Detailed design phase. 3) Manufacturing phase. 4) Testing phase. 5) Installation and commissioning phase.	c. Inspections will be performed to verify that the SICS detailed design phase process has design outputs.	c. A report exists and provides the design outputs for the detailed design phase of the SICS hardware and software design process.
		d. Analyses will be performed to verify that the design outputs for the SICS detailed design phase conform to the requirements of that phase.	d. A V&V report exists and concludes that the design outputs conform to the requirements of the SICS detailed design phase.
		e. Inspections will be performed to verify that the SICS manufacturing phase process has design outputs.	e. A report exists and provides the design outputs for the manufacturing phase of the SICS hardware and software design process.
		f. Inspections will be performed to verify that the SICS testing phase process has design outputs.	f. A report exists and provides the design outputs for the testing phase of the SICS hardware and software design process.
		g. Analyses will be performed to verify that the design outputs for the SICS testing phase conform to the requirements of that phase.	g. A V&V report exists and concludes that the design outputs of the testing phase conform to the requirements of the SICS testing phase.
		h. Inspections will be performed to verify that the SICS installation and commissioning phase process has design outputs.	h. A report exists and provides the design outputs for the installation and commissioning phase of the SICS hardware and software design process.
		i. Analyses will be performed to verify that the design outputs for the SICS installation and commissioning phase conform to the requirements of that phase.	i. A V&V report exists and concludes that the design outputs of the SICS installation and commissioning phase conform to the requirements of the installation and commissioning phase.

Table 2.4.2-2—Safety Information and Control System ITAAC (4 Sheets)

Commitment Wording		Inspections, Tests, Analyses	Acceptance Criteria
4.6	Electrical isolation is provided between the RSS and the MCR for the SICS.	An inspection will be performed.	Electrical isolation is provided between RSS and the MCR for the SICS.
5.1	The components identified as Class 1E in Table 2.4.2-1 are powered from the Class 1E division as listed in Table 2.4.2-1 in a normal or alternate feed condition.	a. Testing will be performed for components identified as Class 1E in Table 2.4.2-1 by providing a test signal in each normally aligned division. b. Testing will be performed for components identified as Class 1E in Table 2.4.2-1 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 2.4.2-1. 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 2.4.2-1.

Next File