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 Physical separation exists between the four safety related divisions of the SICS.

3.0 Mechanical Design Features

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

4.0 I&C Design Features, Displays and Controls

4.1 Main Control Room actions required to transfer control to the RSS can be accomplished during a rapid evacuation of the MCR. This process provides for the transfer of control of the SICS from the MCR to the RSS. Procedures exist for the evacuation of the MCR and the transfer of control of the SICS from the MCR to RSS.

4.2 The SICS provides a minimum inventory of controls, displays and alarms available in the MCR and the RSS.

4.3 Electrical isolation devices exist in the signal paths between the safety related parts of 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 with the following life cycle phases:

- Basic design phase.
- Detailed design phase.
- Manufacturing phase.
- Testing phase.
- Installation and commissioning phase.

5.0 Electrical Power

5.1 The equipment identified as Class 1E in Table 2.4.2-1 receives power from a Class 1E power source.

6.0 System Inspections, Tests, Analyses, and Acceptance Criteria

6.1 Table 2.4.2-2—Safety Information and Control System ITAAC specifies the inspections, tests, analyses, and acceptance criteria for the SICS.

Table 2.4.2-1—Safety Information and Control System Equipment

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

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

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

Commitment Wording	Inspection, Analysis or Test	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 Physical separation exists between the four safety related divisions of the SICS.	Inspections will be performed on the as-built SICS to confirm that adequate separation exists between the four safety related divisions of SICS	The separation between the safety related components of the SICS of different divisions is as follows: • Within the MCR and RSS, the minimum vertical separation is 3 inches and the minimum horizontal separation is 1 inch. • Within other plant areas, the minimum vertical separation is 12 inches and the minimum horizontal separation is 6 inches.
3.1 Equipment identified as Seismic Category I in Table 2.4.2-1 is designed to perform its function following the design basis seismic event.	Inspections, type tests, tests, analyses or a combination of tests and analyses will be performed on the equipment designated as Seismic Category I in Table 2.4.1-1.	(1) A report exists and concludes that the equipment listed as Seismic Category I in Table 2.4.1-1 is installed as designed. (2) A report exists and concludes 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.
4.1 Procedures exist for the transfer of control of the SICS from the MCR to the RSS.	An inspection will be performed on the existence of procedures for the transfer of control of the SICS from the MCR to the RSS. A test will be performed on the transfer of control of SICS from the MCR to the RSS.	(1) Procedures exist for the transfer of control of the SICS from the MCR to the RSS (2) The procedures provide the capability to transfer control of the SICS from the MCR to the RSS.
4.2 The SICS provides a minimum inventory of controls, displays, and alarms available in the MCR	Inspections and tests will be performed to verify the existence of controls, displays, and alarms	The SICS provides a minimum inventory of controls, displays, and alarms in the MCR and RSS.

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

Commitment Wording	Inspection, Analysis or Test	Acceptance Criteria
and the RSS.	on the as-built SICS in the MCR and the RSS.	The minimum inventory of controls, displays, and alarms on the SICS in the MCR and the RSS is provided by the human factors engineering (HFE) program discussed in Tier 1 Section 3.4.
4.3 Electrical isolation devices exist in the signal paths between the safety related portions of SICS and the non safety I&C systems.	Inspections, type tests, tests, analyses or a combination of tests and analyses will be performed on electrical isolation devices.	Electrical isolation devices exist in the signal paths between the safety related portion of 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 with the following life cycle phases: • Basic design phase. • Detailed design phase. • Manufacturing phase. • Testing phase. • Installation and Commissioning phase.	Inspections will be performed on the design process for the SICS hardware and software development. An analysis will be performed to verify that the SICS hardware and software are developed in accordance with the design process.	1a) A report exists and provides the design outputs of the basic design phase of the SICS hardware and software design process. 1b) V&V reports exist that address the Concept and Requirements Activities and conclude that the design outputs generated in the basic design phase conform to the requirements of this phase. 2a) A report exists and provides the design outputs of the detailed design phase of the SICS hardware and software design process. 2b) V&V reports exist that address the Design and Implementation Activities and conclude that the design outputs generated in the detailed design phase conform to the

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

Commitment Wording	Inspection, Analysis or Test	Acceptance Criteria
		requirements of this phase. 3) A report exists and provides the design outputs of the manufacturing phase of the SICS hardware and software design process. 4a) A report exists and provides the design outputs of the testing phase of the SICS hardware and software design process. 4b) A V&V report exists that address the Test Activity and concludes that the design outputs generated in the testing phase conform to the requirements of this phase. 5a) A report exists and provides the design outputs of the installation and commissioning phase of the SICS hardware and software design process. 5b) A V&V report exists that addresses the Installation and Checkout Activity summary report, if required, for any changes following testing phase and concludes that the design outputs generated in the installation and commissioning phase conform to the requirements of this phase.
5.1 The equipment identified as Class 1E in Table 2.4.2-1 receives power from a Class 1E power source.	Inspections will be performed to verify the source of power for Class 1E equipment.	The Class 1E equipment listed in Table 2.4.2-1 is powered from a Class 1E power source.