

2.4.13 Control Rod Drive Control System

1.0 Description

The control rod drive control system (CRDCS) controls the actuation of power to the control rod drive mechanisms (CRDM).

The CRDCS has the following safety-related functions:

- Interrupts power to the CRDMs via the reactor trip contactors.
- Provides signals that report the status of the reactor trip contactor modules to the PS.

The CRDCS provides the following non-safety-related functions:

- Actuates the rod control cluster assemblies through the CRDMs.

2.0 Arrangement

2.1 The CRDCS equipment is located as listed in Table 2.4.13-1—Control Rod Drive Control System Equipment.

3.0 Mechanical Design Features

3.1 Equipment identified as Seismic Category I in Table 2.4.13-1 can withstand seismic design basis loads without loss of safety function.

4.0 I&C Design Features, Displays and Controls

4.1 The CRDCS equipment classified as Class 1E in Table 2.4.13-1 can perform its safety function when subjected to electromagnetic interference (EMI), radio-frequency interference (RFI), electrostatic discharges, and power surges.

4.2 The CRDCS receives inputs from the sources listed in Table 2.4.13-2.

4.3 The reactor trip contactors in the reactor trip contactor module open when reactor trip signals from at least two of the four PS divisions are received by the module.

5.0 System Inspections, Tests, Analyses, and Acceptance Criteria

Table 2.4.13-3 lists the CRDCS ITAAC.

Table 2.4.13-1—Control Rod Drive Control System Equipment

Equipment Description	Equipment Tag Number ⁽¹⁾	Equipment Location	Seismic Category	IEEE Class 1E
Reactor trip contactor modules	31BUA1BZ001 31BUA2BZ001 31BUA3BZ001 31BUA4BZ001 31BUA5BZ001 31BUA6BZ001 31BUA7BZ001 31BUA8BZ001 31BUA9BZ001 31BUA10BZ001 31BUA11BZ001	Safeguard Building 1	I	Yes
Reactor trip contactor modules	34BUA1BZ001 34BUA2BZ001 34BUA3BZ001 34BUA4BZ001 34BUA5BZ001 34BUA6BZ001 34BUA7BZ001 34BUA8BZ001 34BUA9BZ001 34BUA10BZ001 34BUA11BZ001 34BUA12BZ001	Safeguard Building 4	I	Yes

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

Table 2.4.13-2—Control Rod Drive Control System Input Signals

Item #	Signal	Source	# Divisions	IEEE Class 1E
1	Reactor Trip Signal	PS	4	Yes

**Table 2.4.13-3—Control Rod Drive Control System ITAAC
(2 Sheets)**

Commitment Wording		Inspections, Tests, Analyses	Acceptance Criteria
2.1	The CRDCS equipment is located as listed in Table 2.4.13-1.	Inspections will be performed of the location of the CRDCS equipment.	The equipment listed in Table 2.4.13-1 is located as listed in Table 2.4.13-1.
3.1	Equipment identified as Seismic Category I in Table 2.4.13-1 can withstand seismic design basis loads without loss of safety function.	<p>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 2.4.13-1 using analytical assumptions, or under conditions, which bound the Seismic Category I design requirements.</p> <p>b. Inspections will be performed of the as-installed Seismic Category I equipment listed in Table 2.4.13-1 to verify that the equipment including anchorage is installed as specified on the construction drawings.</p>	<p>a. Tests/analysis reports exist and conclude that the equipment listed as Seismic Category I in Table 2.4.13-1 can withstand seismic design basis loads without loss of safety function.</p> <p>b. Inspection reports exist and conclude that the as-installed Seismic Category I equipment listed in Table 2.4.13-1 including anchorage is installed as specified on the construction drawings.</p>
4.1	The CRDCS equipment classified as Class 1E in Table 2.4.13-1 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 2.4.13-1.	A report exists and concludes that the equipment listed as Class 1E in Table 2.4.13-1 can perform its safety function when subjected to EMI, RFI, ESD, and power surges.
4.2	The CRDCS receives input signals from the sources listed in Table 2.4.13-2.	Tests will be performed to verify the existence of input signals.	The CRDCS receives input signals from the sources listed in Table 2.4.13-2.

**Table 2.4.13-3—Control Rod Drive Control System ITAAC
(2 Sheets)**

	Commitment Wording	Inspections, Tests, Analyses	Acceptance Criteria
4.3	The reactor trip contactors in the reactor trip contactor modules open when reactor trip signals from at least two of the four PS divisions are received by the module.	An operational test of the as-built reactor trip contactor modules will be performed using test signals.	<p>The reactor trip contactors in the reactor trip contactor modules open when reactor trip test signals from the PS for any one or more of the following divisional combinations are received by the module:</p> <ul style="list-style-type: none"> • (1 and 2) • (1 and 3) • (1 and 4) • (2 and 3) • (2 and 4) • (3 and 4) • (1 and 2 and 3) • (1 and 2 and 4) • (1 and 3 and 4) • (2 and 3 and 4) • (1 and 2 and 3 and 4)