

2.4.17 Excore Instrumentation System

1.0 Description

The excore instrumentation system (EIS) provides signals indicative of neutron flux level conditions to other I&C systems.

The EIS has the following safety related function:

- Provides neutron flux level signals to the signal conditioning and distribution system (SCDS).

2.0 Arrangement

2.1 The EIS equipment is located as listed in Table 2.4.17-1—Excore Instrumentation System Equipment.

3.0 Mechanical Design Features

3.1 Equipment identified as Seismic Category I in Table 2.4.17-1 can withstand seismic design basis loads without loss of safety function.

4.0 I&C Design Features, Displays and Controls

4.1 The EIS equipment classified as Class 1E in Table 2.4.17-1 can perform its safety function when subjected to electromagnetic interference (EMI), radio-frequency interference (RFI), electrostatic discharges (ESD), and power surges.

4.2 The EIS provides output signals listed in Table 2.4.17-2.

5.0 Electrical Power Design Features

5.1 The components identified as Class 1E in Table 2.4.17-1 are powered from the Class 1E division as listed in Table 2.4.17-1 in a normal or alternate feed condition.

6.0 Environmental Qualifications

6.1 Components listed as Class 1E in Table 2.4.17-1 that are designated as harsh environment, will perform their function in the environments that exist during and following design basis events.

7.0 System Inspections, Tests, Analyses, and Acceptance Criteria

Table 2.4.17-3 lists the EIS ITAAC.

**Table 2.4.17-1—Excore Instrumentation System Equipment
(2 Sheets)**

Description	Tag Number ⁽¹⁾	Location	Seismic Class	IEEE Class 1E ⁽²⁾	Harsh Environment
Source Range Detector, Division 1	30JKT01CX851	Reactor Building	I	1 ^N 2 ^A	Yes
Source Range Detector, Division 2	30JKT01CX852	Reactor Building	I	2 ^N 1 ^A	Yes
Source Range Detector, Division 3	30JKT01CX853	Reactor Building	I	3 ^N 4 ^A	Yes
Intermediate Range Detector, Division 1	30JKT02CX851	Reactor Building	I	1 ^N 2 ^A	Yes
Intermediate Range Detector, Division 2	30JKT02CX852	Reactor Building	I	2 ^N 1 ^A	Yes
Intermediate Range Detector, Division 3	30JKT02CX853	Reactor Building	I	3 ^N 4 ^A	Yes
Intermediate Range Detector, Division 4	30JKT02CX854	Reactor Building	I	4 ^N 3 ^A	Yes
Upper Core Half Power Range Detector, Division 1	30JKT03CX851	Reactor Building	I	1 ^N 2 ^A	Yes
Lower Core Half Power Range Detector, Division 1	30JKT03CX855	Reactor Building	I	1 ^N 2 ^A	Yes
Upper Core Half Power Range Detector, Division 2	30JKT03CX852	Reactor Building	I	2 ^N 1 ^A	Yes
Lower Core Half Power Range Detector, Division 2	30JKT03CX856	Reactor Building	I	2 ^N 1 ^A	Yes
Upper Core Half Power Range Detector, Division 3	30JKT03CX853	Reactor Building	I	3 ^N 4 ^A	Yes
Lower Core Half Power Range Detector, Division 3	30JKT03CX857	Reactor Building	I	3 ^N 4 ^A	Yes
Upper Core Half Power Range Detector, Division 4	30JKT03CX854	Reactor Building	I	4 ^N 3 ^A	Yes

**Table 2.4.17-1—Excore Instrumentation System Equipment
(2 Sheets)**

Description	Tag Number ⁽¹⁾	Location	Seismic Class	IEEE Class 1E ⁽²⁾	Harsh Environment
Lower Core Half Power Range Detector, Division 4	30JKT03CX858	Reactor Building	I	4 ^N 3 ^A	Yes
Excore Instrumentation Conditioning Cabinets – Division 1	30CLE13	Safeguard Building 1	I	1 ^N 2 ^A	No
Excore Instrumentation Conditioning Cabinets – Division 2	30CLF13	Safeguard Building 2	I	2 ^N 1 ^A	No
Excore Instrumentation Conditioning Cabinets – Division 3	30CLG13	Safeguard Building 3	I	3 ^N 4 ^A	No
Excore Instrumentation Conditioning Cabinets – Division 4	30CLH13	Safeguard Building 4	I	4 ^N 3 ^A	No

- 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 2.4.17-2—Excore Instrumentation System Output Signals

Item #	Output Signal	Recipient	# of Divisions
1	Intermediate Range Detector Signal	SCDS	4
2	Power Range Detector Signal	SCDS	4
3	Source Range Detector Signal	SCDS	3

**Table 2.4.17-3—Excore Instrumentation System ITAAC
(2 Sheets)**

Commitment Wording		Inspections, Tests, Analyses	Acceptance Criteria
2.1	The EIS equipment is located as listed in Table 2.4.17-1.	Inspections will be performed of the location of the EIS equipment.	The equipment listed in Table 2.4.17-1 is located as listed in Table 2.4.17-1.
3.1	Equipment identified as Seismic Category I in Table 2.4.17-1 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 2.4.17-1 using analytical assumptions, or under conditions, which bound the Seismic Category I design requirements.</p> <p>b. Inspections will be performed of the Seismic Category I equipment listed in Table 2.4.17-1 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 2.4.17-1 can withstand seismic design basis loads without loss of safety function.</p> <p>b. Inspection reports exist and conclude that the Seismic Category I equipment listed in Table 2.4.17-1 including anchorage is installed as specified on the construction drawings.</p>
4.1	The EIS equipment classified as Class 1E in Table 2.4.17-1 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 2.4.17-1.	A report exists and concludes that the equipment listed as Class 1E in Table 2.4.17-1 can perform its safety function when subjected to EMI, RFI, ESD, and power surges.
4.2	The EIS system provides output signals listed in Table 2.4.17-2.	Tests will be performed to verify the existence of output signals.	The EIS system provides output signals to the recipients listed in Table 2.4.17-2.

**Table 2.4.17-3—Excore Instrumentation System ITAAC
(2 Sheets)**

Commitment Wording		Inspections, Tests, Analyses	Acceptance Criteria
5.1	The components identified as Class 1E in Table 2.4.17-1 are powered from the Class 1E division as listed in Table 2.4.17-1 in a normal or alternate feed condition.	<ul style="list-style-type: none"> a. Testing will be performed for components identified as Class 1E in Table 2.4.17-1 by providing a test signal in each normally aligned division. b. Testing will be performed for components identified as Class 1E in Table 2.4.17-1 by providing a test signal in each division with the alternate feed aligned to the divisional pair. 	<ul style="list-style-type: none"> a. The test signal provided in the normally aligned division is present at the respective Class 1E components identified in Table 2.4.17-1. 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 2.4.17-1.
6.1	Components listed as Class 1E in Table 2.4.17-1 that are designated as harsh environment, will perform their function in the environments that exist during and following design basis events.	<ul style="list-style-type: none"> a. Type tests or type tests and analysis will be performed to demonstrate the ability of the components listed as Class 1E in Table 2.4.17-1 to perform their function for the environmental conditions that could occur during and following design basis events. b. Components listed as Class 1E in Table 2.4.17-1 will be inspected to verify installation in accordance with the construction drawings including the associated wiring, cables and terminations. Deviations to the construction drawings will be reconciled to the EQDP. 	<ul style="list-style-type: none"> a. Environmental Qualification Data Packages (EQDP) exist and conclude that the components listed as Class 1E in Table 2.4.17-1 can perform their function during and following design basis events including the time required to perform the listed function. b. Inspection reports exist and conclude that the components listed as Class 1E in Table 2.4.17-1 has been installed per the construction drawings and any deviations have been reconciled to the EQDP.

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