

2.4.22 Radiation Monitoring System

1.0 Description

The radiation monitoring system provides surveillance of ionizing radiation comprising all provisions dealing with the occurrence of ionizing radiation within the plant and measures related to the health control of personnel who could be exposed to radiation.

The radiation monitoring system provides the following safety-related function:

- Provides surveillance of ionizing radiation and provides a signal that initiates Reactor Building air filtration isolation.

The radiation monitoring system provides the following non-safety related function:

- Provides signals for the display of non-safety related radiological conditions.

2.0 Arrangement

2.1 The location of the radiation monitoring system equipment is as listed in Table 2.4.22-1—Radiation Monitoring System Equipment Mechanical Design.

3.0 Mechanical Design Features

3.1 Components identified as Seismic Category I in Table 2.4.22-1 can withstand seismic design basis loads without a loss of the function listed in Table 2.4.22-1.

4.0 Displays and Controls

4.1 Each monitor listed in Table 2.4.22-1 initiates a MCR alarm when radiation level exceeds a preset limit.

4.2 Each channel for monitors listed in Table 2.4.22-1 provides an indication of radiation level.

5.0 Electrical Power Design Features

5.1 The components identified as Class 1E in Table 2.4.22-2 are powered from the Class 1E division as listed in Table 2.4.22-2 in a normal or alternate feed condition.

6.0 Environmental Qualifications

6.1 Components in Table 2.4.22-2, that are designated as harsh environment, will perform the function listed in Table 2.4.22-1 in the environments that exist during and following design basis events.

7.0 Equipment and System Performance

7.1 Containment High Range Dose Rate Monitors listed in Table 2.4.22-1 initiate Reactor Building air filtration isolation upon receipt of high radioactivity levels.

8.0 Inspections, Tests, Analyses, and Acceptance Criteria

Table 2.4.22-3 lists the radiation monitoring system ITAAC.

**Table 2.4.22-1—Radiation Monitoring System Equipment
Mechanical Design**

Description	Tag Number ⁽¹⁾	Location	Function	Seismic Category
Containment High Range Dose Rate Monitor	30JYK15CR101	Reactor Building	Monitor Post Accident Radioactivity Levels	I
Containment High Range Dose Rate Monitor	30JYK15CR102	Reactor Building	Monitor Post Accident Radioactivity Levels	I
Containment High Range Dose Rate Monitor	30JYK15CR103	Reactor Building	Monitor Post Accident Radioactivity Levels	I
Containment High Range Dose Rate Monitor	30JYK28CR101	Reactor Building	Monitor Post Accident Radioactivity Levels	I

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

Table 2.4.22-2—Radiation Monitoring System Equipment I&C and Electrical Design

Description	Tag Number ⁽¹⁾	Location	IEEE Class 1E ⁽²⁾	EQ – Harsh Env.	MCR/RSS Displays
Containment High Range Dose Rate Monitor	30JYK15CR101	Reactor Building	1 ^N 2 ^A	Yes	Radiation Alarm/ Radiation Alarm
Containment High Range Dose Rate Monitor	30JYK15CR102	Reactor Building	2 ^N 1 ^A	Yes	Radiation Alarm/ Radiation Alarm
Containment High Range Dose Rate Monitor	30JYK15CR103	Reactor Building	3 ^N 4 ^A	Yes	Radiation Alarm/ Radiation Alarm
Containment High Range Dose Rate Monitor	30JYK28CR101	Reactor Building	4 ^N 3 ^A	Yes	Radiation Alarm/ Radiation Alarm

- 1) Equipment tag numbers are provided for information only and are not part of the certified design.
- 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 2.4.22-3—Radiation Monitoring System ITAAC
(3 Sheets)**

Commitment Wording		Inspections, Tests, Analyses	Acceptance Criteria
2.1	The location of the radiation monitoring system equipment is as listed in Table 2.4.22-1.	An inspection will be performed of the location of the equipment listed in Table 2.4.22-1.	The equipment listed in Table 2.4.22-1 is located as listed in Table 2.4.22-1.
3.1	Components identified as Seismic Category I in Table 2.4.22-1 can withstand seismic design basis loads without a loss of the function listed in Table 2.4.22-1.	<p>a. Type tests, analyses, or a combination of type tests and analyses will be performed on the components identified as Seismic Category I in Table 2.4.22-1 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 components identified in Table 2.4.22-1 to verify that the components, including anchorage, are installed as specified on the construction drawings and deviations have been reconciled to the seismic qualification reports (SQDP, EQDP, or analyses).</p>	<p>a. Seismic qualification reports (SQDP, EQDP, or analyses) exist and conclude that the Seismic Category I components identified in Table 2.4.22-1 can withstand seismic design basis loads without a loss of the function listed in Table 2.4.22-1 including the time required to perform the listed function.</p> <p>b. Inspection reports exist and conclude that the Seismic Category I components identified in Table 2.4.22-1, including anchorage, are installed as specified on the construction drawings and deviations have been reconciled to the seismic qualification reports (SQDP, EQDP, or analyses).</p>
4.1	Each monitor listed in Table 2.4.22-1 initiates a MCR alarm when radiation level exceeds a preset limit.	A test will be performed to verify that the MCR alarm is initiated when radiation level exceeds a preset limit.	The monitors listed in Table 2.4.22-1 initiate MCR alarm when a radiation level exceeds a preset limit.
4.2	Each channel for monitors listed in Table 2.4.22-1 provides an indication of radiation level.	A test will be performed to verify that each channel responds to radiation.	The monitors listed in Table 2.4.22-1 indicate radiation levels for each channel.

**Table 2.4.22-3—Radiation Monitoring System ITAAC
(3 Sheets)**

Commitment Wording		Inspections, Tests, Analyses	Acceptance Criteria
5.1	The components identified as Class 1E in Table 2.4.22-2 are powered from the Class 1E division as listed in Table 2.4.22-2 in a normal or alternate feed condition.	<p>a. Testing will be performed for components identified as Class 1E in Table 2.4.22-2 by providing a test signal in each normally aligned division.</p> <p>b. Testing will be performed for components identified as Class 1E in Table 2.4.22-2 by providing a test signal in each division with the alternate feed aligned to the divisional pair.</p>	<p>a. The test signal provided in the normally aligned division is present at the respective Class 1E components identified in Table 2.4.22-2.</p> <p>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 2.4.22-2.</p>
6.1	Components in Table 2.4.22-2, that are designated as harsh environment, will perform the function listed in Table 2.4.22-1 in the environments that exist during and following design basis events.	<p>a. Type tests or type tests and analysis will be performed to demonstrate the ability of the components listed as harsh environment in Table 2.4.22-2 to perform the function listed in Table 2.4.22-1 for the environmental conditions that could occur during and following design basis events.</p> <p>b. Components listed as harsh environment in Table 2.4.22-2 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.</p>	<p>a. Environmental Qualification Data Packages (EQDP) exist and conclude that the components listed as harsh environment in Table 2.4.22-2 can perform the function listed in Table 2.4.22-1 during and following design basis events including the time required to perform the listed function.</p> <p>b. Inspection reports exist and conclude that the components listed in Table 2.4.22-2 as harsh environment has been installed per the construction drawings and any deviations have been reconciled to the EQDP.</p>

**Table 2.4.22-3—Radiation Monitoring System ITAAC
(3 Sheets)**

Commitment Wording		Inspections, Tests, Analyses	Acceptance Criteria
7.1	Containment High Range Dose Rate Monitors listed in Table 2.4.22-1 initiates Reactor Building air filtration isolation upon receipt of high radioactivity levels.	A test will be performed to verify that the Reactor Building air filtration is isolated upon radiation levels exceeding a preset limit.	Containment High Range Dose Rate Monitors listed in Table 2.4.22-1 initiate Reactor Building air filtration isolation when radiation level exceeds a preset limit.

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