2.5.9 Lighting System

Design Description

1.0 System Description

The lighting system includes the emergency lighting and special emergency lighting sub-systems. The emergency lighting system and special emergency lighting system fixtures are normally energized and combine to provide main control room (MCR) and remote shutdown station (RSS) lighting during normal and off normal operation. The lighting system is non-safety-related.

2.0 Mechanical Design Features

2.1 Lighting fixtures in the MCR and RSS are Seismic Category II and can withstand seismic design basis loads without affecting safety functions.

3.0 Electrical Power Design Features

3.1 Emergency lighting in the MCR and RSS is powered from the emergency power supply system (EPSS).

3.2 Special emergency lighting in the MCR and RSS is powered from the Class 1E uninterruptible power supply system (EUPS).

3.3 The emergency lighting and special emergency lighting sub-systems provide illumination at the MCR and RSS workstations and safety-related panels.

3.4 Deleted.

3.5 Eight-hour battery pack emergency lighting fixtures provide illumination for post-fire shutdown activities performed by operators outside the MCR or RSS where eight-hour battery pack emergency lighting fixtures are utilized.

Inspections, Tests, Analyses, and Acceptance Criteria

Table 2.5.9-1 lists the lighting system ITAAC.

Table 2.5.9-1—Lighting System ITAAC
Sheet 1 of 2

Commitment Wording		Inspections, Tests, Analyses	Acceptance Criteria
2.1	Lighting fixtures in the MCR and RSS can withstand seismic design basis loads without affecting safety function(s).	a. Type tests, analyses, or a combination of type tests and analyses will be performed on lighting fixtures in the MCR and RSS using analytical assumptions, or under conditions, which bound the Seismic Category I design requirements. b. An inspection will be performed of the as-built lighting fixtures in the MCR and RSS to verify that the equipment, including anchorage, are installed in a condition bounded by the tested or analyzed condition.	a. Seismic qualification reports (SQDP, EQDP, or analyses) conclude that lighting fixtures in the MCR and RSS can withstand seismic design basis loads without affecting safety function(s). b. Inspection reports conclude that lighting fixtures in the MCR and RSS, including anchorage, are installed in a condition bounded by the tested or analyzed condition.
3.1	Emergency lighting in the MCR and RSS is powered from the EPSS.	A test will be performed to verify that the emergency lighting in the MCR and RSS is powered from the EPSS.	a. The emergency lighting system provides lighting in the MCR and is powered from the EPSS. b. The emergency lighting system provides lighting in the RSS and is powered from the EPSS.
3.2	Special emergency lighting in the MCR and RSS is powered by the EUPS.	A test will be performed to verify that the special emergency lighting in the MCR and RSS is powered by the EUPS.	a. The special emergency lighting system provides lighting in the MCR and is powered from the EUPS. b. The special emergency lighting system provides lighting in the RSS and is powered from the EUPS.

Table 2.5.9-1—Lighting System ITAAC
Sheet 2 of 2

Commitment Wording		Inspections, Tests, Analyses	Acceptance Criteria
3.3	The emergency lighting and special emergency lighting sub-systems provide illumination at the MCR and RSS workstations and safety-related panels.	A test will be performed to verify that the emergency lighting and special emergency lighting sub-systems provide illumination at the MCR and RSS workstations and safety-related panels.	a. The emergency lighting and special emergency lighting sub-systems provide at least 100 foot-candles illumination at the MCR workstations and at least 50 foot-candles at the safety-related panels. b. The emergency lighting and special emergency lighting sub-systems provide at least 100 foot-candles illumination at the RSS workstations. c. The special emergency lighting system provides at least ten foot-candles at the MCR operator workstation when it is the only MCR lighting system in operation. d. The special emergency lighting system provides at least ten foot-candles at the RSS operator workstation when it is the only RSS lighting system in operation.
3.4	Deleted.	Deleted.	Deleted.
3.5	Eight-hour battery pack emergency lighting fixtures provide illumination for post-fire shutdown activities performed by operators outside the MCR or RSS where eight-hour battery pack emergency lighting fixtures are utilized.	A test will be performed to verify that eight-hour battery pack emergency lighting fixtures provide illumination for post-fire shutdown activities performed by operators outside the MCR or RSS.	Eight-hour battery pack emergency lighting fixtures provide at least one foot-candle illumination in areas outside the MCR and RSS where post-fire shutdown activities are performed.

2.5.10 Normal Power Supply System

Design Description

1.0 System Description

The normal power supply system (NPSS) provides non-Class 1E power to non-safety-related loads including reactor coolant pumps (RCP) during normal operation.

2.0 Arrangement

2.1 The functional arrangement of the NPSS is as described in the Design Description of Section 2.5.10, Table 2.5.10-1—Normal Power Supply System Electrical Equipment Design, and as shown on Figure 2.5.10-1—Normal Power Supply System Functional Arrangement.

2.2 Deleted.

3.0 Mechanical Design Features

3.1 Equipment identified as Class 1E in Table 2.5.10-1 are qualified as Seismic Category I and can withstand seismic design basis loads without a loss of safety function(s).

4.0 I&C Design Features, Displays, and Controls

4.1 Displays listed in Table 2.5.10-1 are indicated on the PICS operator workstations in the MCR and the RSS.

4.2 Controls on the PICS operator workstations in the MCR and the RSS perform the function listed in Table 2.5.10-1.

5.0 Electrical Power Design Features

5.1 Control power for RCP circuit breaker located in the switchgear listed in Table 2.5.10-1 is provided by the Class 1E uninterruptible power supply system (EUPS) from the respective division.

5.2 Control power for switchgear feeder circuit breakers located in the switchgear listed in Table 2.5.10-1 is provided by the EUPS of a different division.

6.0 Equipment and System Performance

6.1 Deleted.

6.2 Deleted.

Inspections, Tests, Analyses, and Acceptance Criteria

Table 2.5.10-2—Normal Power Supply System ITAAC provides the ITAAC for the NPSS.

Table 2.5.10-1—NPSS Electrical Equipment Design

Description[1]	IEEE Class 1E	Location	MCR / RSS Displays	MCR / RSS Controls
13.8 kV Switchgear 31BDE	Yes	Safeguard Building 1	Breaker position / Breaker position	Open / Open
13.8 kV Switchgear 32BDE	Yes	Safeguard Building 2	Breaker position / Breaker position	Open / Open
13.8 kV Switchgear 33BDE	Yes	Safeguard Building 3	Breaker position / Breaker position	Open / Open
13.8 kV Switchgear 34BDE	Yes	Safeguard Building 4	Breaker position / Breaker position	Open / Open

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

Table 2.5.10-2—Normal Power Supply System ITAAC
Sheet 1 of 2

Commitment Wording		Inspections, Tests, Analyses	Acceptance Criteria
2.1	The functional arrangement of the NPSS is as described in the Design Description of Section 2.5.10, Table 2.5.10-1, and as shown on Figure 2.5.10-1.	An inspection of the as-built NPSS functional arrangement will be performed.	The NPSS conforms to the functional arrangement as described in the Design Description of Section 2.5.10, Table 2.5.10-1, and as shown on Figure 2.5.10-1.
2.2	Deleted.	Deleted.	Deleted.
3.1	Equipment identified as Class 1E in Table 2.5.10-1 are qualified as Seismic Category I and can withstand seismic design basis loads without a loss of safety function(s).	a. Type tests, analyses, or a combination of type tests and analyses will be performed on the equipment identified as Class 1E in Table 2.5.10-1 using analytical assumptions, or under conditions, which bound the Seismic Category I design requirements. b. An inspection will be performed of the as-built equipment identified as Class 1E in Table 2.5.10-1 to verify that the equipment, including anchorage, are installed in a condition bounded by the tested or analyzed condition.	a. Tests/analysis reports conclude that the equipment identified as Class 1E in Table 2.5.10-1 can withstand seismic design basis loads without a loss of safety function(s). b. Inspection reports conclude that the equipment identified as Class 1E in Table 2.5.10-1, including anchorage, are installed in a condition bounded by the tested or analyzed condition.
4.1	Displays listed in Table 2.5.10-1 are indicated on the PICS operator workstations in the MCR and the RSS.	a. Tests will be performed to verify that the displays listed in Table 2.5.10-1 are indicated on the PICS operator workstations in the MCR. b. Tests will be performed to verify that the displays listed in Table 2.5.10-1 are indicated on the PICS operator workstations in the RSS.	a. Displays listed in Table 2.5.10-1 are indicated on the PICS operator workstations in the MCR. b. Displays listed in Table 2.5.10-1 are indicated on the PICS operator workstations in the RSS.

Table 2.5.10-2—Normal Power Supply System ITAAC
Sheet 2 of 2

Commitment Wording		Inspections, Tests, Analyses	Acceptance Criteria
4.2	Controls on the PICS operator workstations in the MCR and the RSS perform the function listed in Table 2.5.10-1.	a. Tests will be performed using controls on the PICS operator workstations in the MCR. b. Tests will be performed using controls on the PICS operator workstations in the RSS.	a. Controls on the PICS operator workstations in the MCR perform the function listed in Table 2.5.10-1. b. Controls on the PICS operator workstations in the RSS perform the function listed in Table 2.5.10-1.
5.1	Control power for RCP circuit breaker located in the switchgear listed in Table 2.5.10-1 is provided by the EUPS from the respective division.	A test will be performed to verify that control power for RCP circuit breakers is provided by the EUPS from the respective division.	The signal exists only in the control power of the RCP circuit breaker located in the switchgear listed in Table 2.5.10-1 under test.
5.2	Control power for switchgear feeder circuit breakers located in the switchgear listed in Table 2.5.10-1 is provided by the EUPS of a different division.	A test will be performed to verify that control power for switchgear feeder circuit breaker is provided by the EUPS of a different division.	The signal exists only in the control power of the switchgear feeder circuit breaker located in the switchgear listed in Table 2.5.10-1 under test.
6.1	Deleted.	Deleted.	Deleted.
6.2	Deleted.	Deleted.	Deleted.

Figure 2.5.10-1—Deleted

Next File