2.5.7 Non-Class 1E Uninterruptible Power Supply

1.0 Description

The non-Class 1E uninterruptible power supply system (NUPS) provides non-Class 1E uninterruptible power during normal and abnormal operation to non-safety-related Turbine Island and Nuclear Island loads which includes the control rod drive mechanism (CRDM) operating coils. Interruption of power to the CRDM operating coils in a reactor trip condition is a safety-related function accomplished by opening the reactor trip breakers. The reactor trip breakers have a non-safety-related function of opening when the shunt trip coil is energized as a diverse means of opening the breakers.

2.0 Arrangement

2.1 The functional arrangement of NUPS equipment is shown in Figure 2.5.7-1—Non-Class 1E Uninterruptible Power Supply System Functional Arrangement.

2.2 Equipment identified as Class 1E in Table 2.5.7-1—Non-Class 1E Uninterruptible Power Supply Electrical Equipment Design, are located as listed in Table 2.5.7-1.

3.0 Mechanical Design Features, Electrical and Seismic Classifications

3.1 Equipment listed as Class 1E in Table 2.5.7-1 are qualified as Seismic Category I and can withstand seismic design basis loads without loss of safety function

4.0 I&C Design Features, Alarms, Displays and Controls

4.1 Displays listed in Table 2.5.7-1 are retrievable in the main control room (MCR) and the remote shutdown station (RSS) as listed in Table 2.5.7-1.

4.2 NUPS equipment controls are provided in the MCR and RSS as listed in Table 2.5.7-1.

5.0 Electrical Considerations

5.1 Each NUPS battery supplies power for starting and operating design loads for a minimum of two hours when the ac supply to the battery charger is lost.

5.2 Each NUPS battery charger supplies assigned NUPS loads while maintaining the respective NUPS battery charged.

5.3 The NUPS inverters are sized to power the NUPS loads assigned to the respective supplied motor control center (MCC).

5.4 Physical separation exists between Class 1E division reactor trip breakers.

5.5 The reactor trip breakers open when a signal is provided to the shunt trip coil.

6.0 Equipment and System Performance

6.1 The reactor trip breakers open on a protection system signal.

7.0 Inspection, Tests, Analyses and Acceptance Criteria

Table 2.5.7-2 lists the NUPS ITAAC.

Table 2.5.7-1—Non-Class 1E Uninterruptible Power Supply Electrical Equipment Design

Description	Tag Number	Location	IEEE Class 1E	Seismic Class	MRC / RSS Displays	MCR / RSS Controls
Reactor Trip Breaker	Division 1 Reactor Trip Breaker	Safeguard Building 2	Yes	I	Reactor Trip Breaker Position / Reactor Trip Breaker Position	Open / Open
Reactor Trip Breaker	Division 2 Reactor Trip Breaker	Safeguard Building 2	Yes	I	Reactor Trip Breaker Position / Reactor Trip Breaker Position	Open / Open
Reactor Trip Breaker	Division 3 Reactor Trip Breaker	Safeguard Building 3	Yes	I	Reactor Trip Breaker Position / Reactor Trip Breaker Position	Open / Open
Reactor Trip Breaker	Division 4 Reactor Trip Breaker	Safeguard Building 3	Yes	I	Reactor Trip Breaker Position / Reactor Trip Breaker Position	Open / Open

Table 2.5.7-2—Non-Class 1E Uninterruptible Power Supply ITAAC (3 Sheets)

Commitment Wording		Inspections, Tests, Analyses	Acceptance Criteria
2.1	The functional arrangement of the NUPS is as shown on Figure 2.5.7-1.	An inspection of the as-built system will be performed.	The as-built NUPS conforms to the functional arrangement as shown in Figure 2.5.7-1.
2.2	Equipment identified as Class 1E Table 2.5.7-1 is located as listed in Table 2.5.7-1.	An inspection will be performed.	The equipment listed as Class 1E in Table 2.5.7-1 is located as listed in Table 2.5.7-1.
3.1	Equipment listed as Class 1E in Table 2.5.7-1 are qualified as Seismic Category 1 and can withstand seismic design basis loads without loss of safety function.	a. Type tests, analyses, or a combination of type tests and analyses will be performed on the equipment listed as Class 1E in Table 2.5.7-1 using analytical assumptions, or under conditions, which bound the Seismic Category I design requirements. b. Inspections will be performed of the as-built Class 1E equipment listed in Table 2.5.7-1 to verify that the equipment including anchorage is installed as specified on the construction drawings.	a. Tests/analysis reports exist and conclude that the equipment listed as Class 1E in Table 2.5.7-1 can withstand seismic design basis loads without loss of safety function. b. Inspection reports exist and conclude that the as-built Class 1E equipment listed in Table 2.5.7-1 including anchorage is installed as specified on the construction drawings.
4.1	Displays listed in Table 2.5.7-1 are retrievable in the MCR and RSS as listed in Table 2.5.7-1.	A test will be performed.	a. Displays listed in Table 2.5.7-1 as being retrieved in the MCR can be retrieved in the MCR. b. Displays listed in Table 2.5.7-1 as being retrieved in the RSS can be retrieved in the RSS.
4.2	NUPS equipment controls are provided in the MCR and RSS as listed in Table 2.5.7-1.	A test will be performed.	a. Controls listed in Table 2.5.7-1 as being in the MCR exist in the MCR. b. Controls listed in Table 2.5.7-1 as being in the RSS exist in the RSS.

Table 2.5.7-2—Non-Class 1E Uninterruptible Power Supply ITAAC (3 Sheets)

Commitment Wording		Inspections, Tests, Analyses	Acceptance Criteria
5.1	Each NUPS battery supplies power for starting and operating design loads for a minimum of two hours when the ac supply to the battery charger is lost.	a. An analysis will be performed.	a. Analysis concludes the specified NUPS battery is able to provide power for starting and operating analyzed design loads for a minimum time of two hours while battery terminal voltage remains above minimum voltage required for the design loads.
		b. A battery discharge test will be performed.	b. The capacity of the installed NUPS battery is equal to or greater than the analyzed battery design duty cycle capacity.
5.2	Each NUPS battery charger supplies assigned NUPS loads while maintaining the respective NUPS battery charged.	a. An analysis will be performed.	a. Analysis concludes each specified NUPS battery charger rating is greater than the analyzed load requirements.
		b. An inspection will be performed.	b. The ratings of the installed NUPS battery chargers meet the analysis criteria.
5.3	The NUPS inverters are sized to power the loads assigned to the respective supplied MCC.	a. An analysis will be performed.	a. Analysis concludes each specified NUPS inverter rating is greater than the analyzed load requirements.
		b. An inspection will be performed.	b. The ratings of the installed NUPS inverters meet the analysis criteria.
5.4	Physical separation exists between Class 1E division reactor trip breakers.	An inspection will be performed.	The reactor trip breakers are located in separate cabinets within the control rod drive mechanism distribution panels

Table 2.5.7-2—Non-Class 1E Uninterruptible Power Supply ITAAC (3 Sheets)

Commitment Wording		Inspections, Tests, Analyses	Acceptance Criteria
5.5	The reactor trip breakers open when a signal is provided to the shunt trip coil.	A test will be performed.	The reactor trip breakers open when the shunt trip coil is energized.
6.1	The reactor trip breakers open on a protection system signal.	A test will be performed.	The reactor trip breakers open on a protection system signal.

Next File