

## **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 2.5.7-2—Non-Class 1E Uninterruptible Power Supply Electrical Equipment Design, are located as listed in Table 2.5.7-1—Non-Class 1E Uninterruptible Power Supply System Electrical Equipment Location.

### **3.0 Mechanical Design Features, Electrical and Seismic Classifications**

**3.1** Equipment listed as Class 1E in Table 2.5.7-2 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 2.5.7-2 are retrievable in the main control room (MCR) and the remote shutdown station (RSS) as listed in Table 2.5.7-2.

**4.2** NUPS equipment controls are provided in the MCR and RSS as listed in Table 2.5.7-2.

### **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.



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**7.0 Inspection, Tests, Analyses and Acceptance Criteria**

**7.1** Table 2.5.7-3—Non-Class 1E Uninterruptible Power Supply Inspections, Tests, Analyses, and Acceptance Criteria, provides the ITAAC for the NUPS.

**Table 2.5.7-1— Non-Class 1E Uninterruptible Power Supply System Electrical Equipment Location**

<b>Equipment Description</b>	<b>Equipment Tag Number</b>	<b>Equipment Location</b>
Reactor Trip Breaker	Division 1 Reactor Trip Breaker	Division 2 Safeguard Building
Reactor Trip Breaker	Division 2 Reactor Trip Breaker	Division 2 Safeguard Building
Reactor Trip Breaker	Division 3 Reactor Trip Breaker	Division 3 Safeguard Building
Reactor Trip Breaker	Division 4 Reactor Trip Breaker	Division 3 Safeguard Building

**Table 2.5.7-2—Non-Class 1E Uninterruptible Power Supply Electrical Equipment Design**

<b>Equipment Description</b>	<b>Equipment Tag Number</b>	<b>IEEE Class 1E</b>	<b>Seismic Class</b>	<b>MRC / RSS Displays</b>	<b>MCR / RSS Controls</b>
Reactor Trip Breaker	Division 1 Reactor Trip Breaker	Yes	I	Reactor Trip Breaker Position / Reactor Trip Breaker Position	Open / Open
Reactor Trip Breaker	Division 2 Reactor Trip Breaker	Yes	I	Reactor Trip Breaker Position / Reactor Trip Breaker Position	Open / Open
Reactor Trip Breaker	Division 3 Reactor Trip Breaker	Yes	I	Reactor Trip Breaker Position / Reactor Trip Breaker Position	Open / Open
Reactor Trip Breaker	Division 4 Reactor Trip Breaker	Yes	I	Reactor Trip Breaker Position / Reactor Trip Breaker Position	Open / Open

**Table 2.5.7-3—Non-Class 1E Uninterruptible Power Supply Inspections, Tests, Analyses, and Acceptance Criteria (2 Sheets)**

	<b>Commitment</b>	<b>Inspection, Test or Analysis</b>	<b>Acceptance Criteria</b>
2.1	The functional arrangement of the NUPS is as shown on Figure 2.5.7-1.	An inspection 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 2.5.7-2 is located as listed in Table 2.5.7-1.	An inspection will be performed.	The equipment listed as Class 1E in Table 2.5.7-2 is located as indicated in Table 2.5.7-1.
3.1	Equipment listed as Class 1E in Table 2.5.7-2 are qualified as Seismic Category 1 and can withstand seismic design basis loads without loss of safety function.	<ul style="list-style-type: none"> <li>a. An inspection will be performed.</li> <li>b. Type testing, analysis, or a combination of type testing and analysis will be performed.</li> </ul>	<ul style="list-style-type: none"> <li>a. A report exists and concludes that the equipment designated as Class 1E in Table 2.5.7-2 is installed as designed.</li> <li>b. A report exists and concludes that the equipment listed as Class 1E in Table 2.5.7-2 can withstand seismic design basis loads without loss of safety function.</li> </ul>
4.1	Displays listed in Table 2.5.7-2 are retrievable in the MCR and RSS as listed in Table 2.5.7-2.	An inspection will be performed.	<p>Displays listed in Table 2.5.7-2 as being retrieved in the MCR can be retrieved in the MCR.</p> <p>Displays listed in Table 2.5.7-2 as being retrieved in the RSS can be retrieved in the RSS.</p>
4.2	NUPS equipment controls are provided in the MCR and RSS as listed in Table 2.5.7-2.	A test will be performed.	<p>Controls listed in Table 2.5.7-2 as being in the MCR exist in the MCR.</p> <p>Controls listed in Table 2.5.7-2 as being in the RSS exist in the RSS.</p>

**Table 2.5.7-3—Non-Class 1E Uninterruptible Power Supply Inspections, Tests, Analyses, and Acceptance Criteria (2 Sheets)**

	<b>Commitment</b>	<b>Inspection, Test or Analysis</b>	<b>Acceptance Criteria</b>
5.1	Each NUPS battery supplies the design loads on the respective dc bus for a period of two hours when the ac supply to the battery charger is lost.	A test will be performed.	Each NUPS battery can supply design loads for a minimum time of two hours while battery terminal voltage remains above minimum voltage required for the design loads.
5.2	Each NUPS battery charger supplies assigned NUPS loads while maintaining the respective NUPS battery charged.	A test will be performed.	Each NUPS battery charger can maintain an output current that can supply the assigned NUPS loads while maintaining the respective NUPS battery charged.
5.3	The NUPS inverters are sized to power the loads assigned to the respective supplied MCC.	A test will be performed.	Each NUPS inverter is sized to power the design NUPS loads on the respective supplied MCC.
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
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.