2.6.13 Essential Service Water Pump Building Ventilation System

Design Description

1.0 System Description

The essential service water pump building ventilation system (ESWPBVS) controls the temperature and air change rate in the essential service water system (ESWS) pump areas for personnel comfort, personnel safety, and equipment protection. The ESWPBVS provides cooling and heating for the ESWS pump area and associated electrical equipment in each of the four ESWS Pump Buildings (ESWPB) to remove equipment heat, and heat generated from other sources. Each building has its own independent ventilation system and is not connected to the other buildings.

The ESWPBVS provides the following safety-related functions:

- Removes heat generated by the ESWS pumps and associated electrical equipment.
- Maintains acceptable temperature limits to support operation of ESWS pumps.

The ESWPBVS provides the following non-safety-related functions:

- Maintains the room ambient conditions to allow personnel access during normal operation.
- Provides ventilation and cooling during plant operation when an ESW pump is not operating.

2.0 Arrangement

2.1 The functional arrangement of the ESWPBVS is as described in the Design Description of Section 2.6.13, Tables 2.6.13-1—Essential Service Water Pump Building Ventilation System Equipment Mechanical Design and 2.6.13-2—Essential Service Water Pump Building Ventilation System Equipment I&C and Electrical Design, and as shown on Figure 2.6.13-1—Essential Service Water Pump Building Ventilation System Functional Arrangement.

2.2 Deleted.

2.3 Physical separation exists between the divisions of the ESWPBVS located in separate ESWPBs as listed in Table 2.6.13-1 and as shown on Figure 2.6.13-1.

3.0 Mechanical Design Features

3.1 Deleted.

3.2 Class 1E dampers listed in Table 2.6.13-2 will function to change position as listed in Table 2.6.13-1 under normal operating conditions.

3.3 Equipment identified as Seismic Category I in Table 2.6.13-1 can withstand seismic design basis loads without a loss of safety function(s).

3.4 Deleted.

3.5 Deleted.

3.6 Equipment listed in Table 2.6.13-1 as ASME AG-1 Code are fabricated, installed, inspected, and tested in accordance with ASME AG-1 Code requirements.

4.0 I&C Design Features, Displays, and Controls

4.1 Displays listed in Table 2.6.13-2 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 2.6.13-2.

4.3 Equipment listed as being controlled by a priority and actuator control system (PACS) module in Table 2.6.13-2 responds to the state requested and provides drive monitoring signals back to the PACS module. The PACS module will protect the equipment by terminating the output command upon the equipment reaching the requested state.

5.0 Electrical Power Design Features

5.1 Equipment designated as Class 1E in Table 2.6.13-2 are powered from the Class 1E division as listed in Table 2.6.13-2 in a normal feed condition.

6.0 Equipment and System Performance

6.1 The ESWPBVS provides cooling to maintain design temperatures in the ESWPBs, while operating in a design basis accident alignment.

Inspections, Tests, Analyses, and Acceptance Criteria

Table 2.6.13-3 lists the ESWPBVS ITAAC.

Table 2.6.13-1—ESWPBVS Equipment Mechanical Design

Description	Tag Number(1)	Location	ASME AG-1 Code	Function	Seismic Category
Air Cooling Coils	30SAQ01AC001 30SAQ02AC001 30SAQ03AC001 30SAQ04AC001	ESW Pump Building 1 ESW Pump Building 2 ESW Pump Building 3 ESW Pump Building 4	Yes	N/A	I
Moisture Separators	30SAQ01AT001 30SAQ02AT001 30SAQ03AT001 30SAQ04AT001	ESW Pump Building 1 ESW Pump Building 2 ESW Pump Building 3 ESW Pump Building 4	Yes	N/A	I
Electrical Heaters	30SAQ01AH001/002 30SAQ02AH001/002 30SAQ03AH001/002 30SAQ04AH001/002	ESW Pump Building 1 ESW Pump Building 2 ESW Pump Building 3 ESW Pump Building 4	Yes	On / Off	I
Recirculation Fans	30SAQ01AN001 30SAQ02AN001 30SAQ03AN001 30SAQ04AN001	ESW Pump Building 1 ESW Pump Building 2 ESW Pump Building 3 ESW Pump Building 4	Yes	Run	I
Motor Operated Outside Air Isolation Dampers	30SAQ01AA007 30SAQ02AA007 30SAQ03AA007 30SAQ04AA007	ESW Pump Building 1 ESW Pump Building 2 ESW Pump Building 3 ESW Pump Building 4	Yes	N/A	I
Prefilters	30SAQ01AT002 30SAQ02AT002 30SAQ03AT002 30SAQ04AT002	ESW Pump Building 1 ESW Pump Building 2 ESW Pump Building 3 ESW Pump Building 4	Yes	N/A	I

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

Table 2.6.13-2—ESWPBVS Equipment I&C and Electrical Design

Description	Tag Number(1)	Location	IEEE Class 1E	PACS	MCR / RSS Displays	MCR / RSS Controls
Electrical Heaters	30SAQ01AH001/002 30SAQ02AH001/002 30SAQ03AH001/002 30SAQ04AH001/002	ESW Pump Building 1 ESW Pump Building 2 ESW Pump Building 3 ESW Pump Building 4	Division 1 Division 2 Division 3 Division 4	Yes	On-Off / On-Off	On-Off / On-Off
Recirculation Fans	30SAQ01AN001 30SAQ02AN001 30SAQ03AN001 30SAQ04AN001	ESW Pump Building 1 ESW Pump Building 2 ESW Pump Building 3 ESW Pump Building 4	Division 1 Division 2 Division 3 Division 4	Yes	On-Off / On-Off	Run-Stop / Run-Stop
Motor Operated Outside Air Isolation Dampers	30SAQ01AA005/007 30SAQ02AA005/007 30SAQ03AA005/007 30SAQ04AA005/007	ESW Pump Building 1 ESW Pump Building 2 ESW Pump Building 3 ESW Pump Building 4	Division 1 Division 2 Division 3 Division 4	Yes	Position/Position	Open-Close/ Open-Close
Temperature Sensors—Elec Heaters	30SAQ01CT002/003 30SAQ02CT002/003 30SAQ03CT002/003 30SAQ04CT002/003	ESW Pump Building 1 ESW Pump Building 2 ESW Pump Building 3 ESW Pump Building 4	Division 1 Division 2 Division 3 Division 4	Yes	Temperature/ Temperature	N/A
Temperature Sensors—M.O. Outside Air Isol Dampers	30SAQ01CT004 30SAQ02CT004 30SAQ03CT004 30SAQ04CT004	ESW Pump Building 1 ESW Pump Building 2 ESW Pump Building 3 ESW Pump Building 4	Division 1 Division 2 Division 3 Division 4	Yes	N/A	N/A

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

Table 2.6.13-3—Essential Service Water Pump Building Ventilation System ITAAC
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Commitment Wording		Inspections, Tests, Analyses	Acceptance Criteria
2.1	The functional arrangement of the ESWPBVS is as described in the Design Description of Section 2.6.13, Tables 2.6.13-1 and 2.6.13-2, and as shown on Figures 2.6.13-1.	An inspection of the as-built ESWPBVS functional arrangement will be performed.	The ESWPBVS conforms to the functional arrangement as described in the Design Description of Section 2.6.13, Tables 2.6.13-1 and 2.6.13-2, and as shown on Figures 2.6.13-1.
2.2	Deleted.	Deleted.	Deleted.
2.3	Physical separation exists between the divisions of the ESWPBVS located in separate ESWPBs as listed in Table 2.6.13-1 and as shown on Figure 2.6.13-1.	An inspection will be performed to verify that the as-built ESWPBVS are located in separate ESWPBs.	The divisions of the ESWPBVS are located in separate ESWPBs as listed in Table 2.6.13-1 and as shown on Figure 2.6.13-1.
3.1	Deleted.	Deleted.	Deleted.
3.2	Class 1E dampers listed in Table 2.6.13-2 will function to change position as listed in Table 2.6.13-1 under normal operating conditions.	Tests will be performed to verify the ability of Class 1E dampers to change position under normal operating conditions.	Class 1E dampers listed in Table 2.6.13-2 change position as listed in Table 2.6.13-1 under normal operating conditions.

Table 2.6.13-3—Essential Service Water Pump Building Ventilation System ITAAC
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Commitment Wording		Inspections, Tests, Analyses	Acceptance Criteria
3.3	Equipment identified as Seismic Category I in Table 2.6.13-1 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 Seismic Category I in Table 2.6.13-1 using analytical assumptions, or under conditions, which bound the Seismic Category I design requirements.	a. Test/analysis reports conclude that the equipment identified as Seismic Category I in Table 2.6.13-1 can withstand seismic design basis loads without a loss of safety function(s).
		b. An inspection will be performed of the as-built equipment identified as Seismic Category I in Table 2.6.13-1 to verify that the equipment, including anchorage, are installed in a condition bounded by the tested or analyzed condition.	b. Inspection reports conclude that the equipment identified as Seismic Category I in Table 2.6.13-1, including anchorage, are installed in a condition bounded by the tested or analyzed condition.
3.4	Deleted.	Deleted.	Deleted.
3.5	Deleted.	Deleted.	Deleted.
3.6	Equipment listed in Table 2.6.13-1 as ASME AG-1 Code are fabricated, installed, inspected, and tested in accordance with ASME AG-1 Code requirements.	An inspection of the as-built construction activities and documentation for ASME AG-1 Code equipment will be conducted.	A report concludes that ASME AG-1 Code equipment listed in Table 2.6.13-1 are fabricated, installed, inspected, and tested in accordance with ASME AG-1 Code requirements.

Table 2.6.13-3—Essential Service Water Pump Building Ventilation System ITAAC
Sheet 3 of 4

Commitment Wording		Inspections, Tests, Analyses	Acceptance Criteria
4.1	Displays listed in Table 2.6.13-2 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 2.6.13-2 are indicated on the PICS operator workstations in the MCR. b. Tests will be performed to verify that the displays listed in Table 2.6.13-2 are indicated on the PICS operator workstations in the RSS.	a. Displays listed in Table 2.6.13-2 are indicated on the PICS operator workstations in the MCR. b. Displays listed in Table 2.6.13-2 are indicated on the PICS operator workstations in the RSS.
4.2	Controls on the PICS operator workstations in the MCR and the RSS perform the function listed in Table 2.6.13-2.	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 2.6.13-2. b. Controls on the PICS operator workstations in the RSS perform the function listed in Table 2.6.13-2.
4.3	Equipment listed as being controlled by a PACS module in Table 2.6.13-2 responds to the state requested and provides drive monitoring signals back to the PACS module. The PACS module will protect the equipment by terminating the output command upon the equipment reaching the requested state.	A test will be performed using test input signals to verify equipment controlled by a PACS module responds to the state requested and provides drive monitoring signals back to the PACS module.	Equipment listed as being controlled by a PACS module in Table 2.6.13-2 responds to the state requested and provides drive monitoring signals back to the PACS module. The PACS module will protect the equipment by terminating the output command upon the equipment reaching the requested state.
5.1	Equipment designated as Class 1E in Table 2.6.13-2 are powered from the Class 1E division as listed in Table 2.6.13-2 in a normal feed condition.	Testing will be performed by providing a test input signal in each normally aligned division.	The test input signal provided in the normally aligned division is present at the respective Class 1E equipment identified in Table 2.6.13-2.

Table 2.6.13-3—Essential Service Water Pump Building Ventilation System ITAAC
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Commitment Wording		Inspections, Tests, Analyses	Acceptance Criteria
6.1	The ESWPBVS provides cooling to maintain design temperatures in the ESWPBs, while operating in a design basis accident alignment.	a. Tests and analysis will be performed to verify ESWPBVS provides cooling to maintain design temperatures in the ESWPBs, while operating in a design basis accident alignment.	a. Each ESWPBVS safety-related cooling coil provides the design cooling requirements, while operating in a design basis accident alignment, and is capable of maintaining temperatures in the ESWPBs.
		b. A test of the ESWPBVS fans will be performed to verify that the air flow is greater than the approved design requirement.	b. Each ESWPBVS safety-related fan is capable of meeting the design air flow requirements, while operating in a design basis accident alignment.

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