

**2.4.14 Hydrogen Monitoring System**

**1.0 Description**

The hydrogen monitoring system (HMS) provides for the monitoring of hydrogen concentration in the containment atmosphere.

The HMS has the following safety related function:

- Measures the hydrogen concentration in containment.

**2.0 Arrangement**

2.1 The HMS system equipment is located as listed in Table 2.4.14-1—Hydrogen Monitoring System Equipment.

**3.0 Mechanical Design Features**

3.1 Equipment identified as Seismic Category I in Table 2.4.14-1 can withstand seismic design basis loads without loss of safety function.

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

4.1 The HMS equipment classified as Class 1E in Table 2.4.14-1 can perform its safety function when subjected to electromagnetic interference (EMI), radio-frequency interference (RFI), electrostatic discharges (ESD), and power surges.

**5.0 Electrical Power Design Features**

5.1 The components identified as Class 1E in Table 2.4.14-1 are powered from the Class 1E division as listed in Table 2.4.14-1 in a normal or alternate feed condition.

**6.0 Environmental Considerations**

6.1 Equipment listed as Class 1E in Table 2.4.14-1 that are designated as harsh environment will perform their safety function in the environments that exist before and during the time required to perform their safety function.

**7.0 System Inspections, Tests, Analyses, and Acceptance Criteria**

Table 2.4.14-2 lists the HMS ITAAC.

**Table 2.4.14-1—Hydrogen Monitoring System Equipment**

<b>Equipment Description</b>	<b>Equipment Tag Number <sup>(1)</sup></b>	<b>Equipment Location</b>	<b>Seismic Category</b>	<b>IEEE Class 1E <sup>(2)</sup></b>	<b>Harsh Environment</b>	<b>MCR/RSS Indication</b>
Hydrogen Sensor	30JMU10CQ001	Reactor Building	I	1 <sup>N</sup> 2 <sup>A</sup>	Yes	Yes
Hydrogen Sensor	30JMU10CQ002	Reactor Building	I	1 <sup>N</sup> 2 <sup>A</sup>	Yes	Yes
Hydrogen Sensor	30JMU10CQ003	Reactor Building	I	1 <sup>N</sup> 2 <sup>A</sup>	Yes	Yes
Hydrogen Sensor	30JMU10CQ004	Reactor Building	I	1 <sup>N</sup> 2 <sup>A</sup>	Yes	Yes
Hydrogen Sensor	30JMU10CQ005	Reactor Building	I	1 <sup>N</sup> 2 <sup>A</sup>	Yes	Yes
Hydrogen Sensor	30JMU10CQ006	Reactor Building	I	1 <sup>N</sup> 2 <sup>A</sup>	Yes	Yes
Hydrogen Sensor	30JMU10CQ007	Reactor Building	I	1 <sup>N</sup> 2 <sup>A</sup>	Yes	Yes

- 1) Equipment tag numbers are provided for information and are not part of the design certification.
- 2) <sup>N</sup> denotes the division the component is normally powered from. <sup>A</sup> denotes the division the component is powered from when alternate feed is implemented.

**Table 2.4.14-2—Hydrogen Monitoring System ITAAC  
(2 Sheets)**

<b>Commitment Wording</b>		<b>Inspections, Tests, Analyses</b>	<b>Acceptance Criteria</b>
2.1	The HMS equipment is located as listed in Table 2.4.14-1.	Inspections will be performed of the location of the HMS equipment.	The equipment listed in Table 2.4.14-1 is located as listed in Table 2.4.14-1.
3.1	Equipment identified as Seismic Category I in Table 2.4.14-1 can withstand seismic design basis loads without loss of safety function.	<p>a. Type tests, analyses or a combination of type tests and analyses will be performed on the equipment listed as Seismic Category I in Table 2.4.14-1 using analytical assumptions, or under conditions, which bound the Seismic Category I design requirements.</p> <p>b. Inspections will be performed of the as-installed Seismic Category I equipment listed in Table 2.4.14-1 to verify that the equipment including anchorage is installed as specified on the construction drawings.</p>	<p>a. Tests/analysis reports exist and conclude that the equipment listed as Seismic Category I in Table 2.4.14-1 withstand seismic design basis loads without loss of safety function.</p> <p>b. Inspection reports exist and conclude that the as-installed Seismic Category I equipment listed in Table 2.4.14-1 including anchorage is installed as specified on the construction drawings.</p>
4.1	The HMS equipment classified as Class 1E in Table 2.4.14-1 can perform its safety function when subjected to EMI, RFI, ESD, and power surges.	Type tests, tests, analyses or a combination of these will be performed for the Class 1E equipment listed in Table 2.4.14-1.	A report exists and concludes that the equipment listed as Class 1E in Table 2.4.14-1 can perform its safety function when subjected to EMI, RFI, ESD, and power surges.

**Table 2.4.14-2—Hydrogen Monitoring System ITAAC  
(2 Sheets)**

	<b>Commitment Wording</b>	<b>Inspections, Tests, Analyses</b>	<b>Acceptance Criteria</b>
5.1	The components identified as Class 1E in Table 2.4.14-1 are powered from the Class 1E division as listed in Table 2.4.14-1 in a normal or alternate feed condition.	<ul style="list-style-type: none"> <li>a. Testing will be performed for components identified as Class 1E in Table 2.4.14-1 by providing a test signal in each normally aligned division.</li> <li>b. Testing will be performed for components identified as Class 1E in Table 2.4.14-1 by providing a test signal in each division with the alternate feed aligned to the divisional pair.</li> </ul>	<ul style="list-style-type: none"> <li>a. The test signal provided in the normally aligned division is present at the respective Class 1E components identified in Table 2.4.14-1.</li> <li>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 2.4.14-1.</li> </ul>
6.1	Equipment listed as Class 1E in Table 2.4.14-1 that are designated as harsh environment will perform their safety function in the environments that exist before and during the time required to perform their safety function.	Type tests, tests, analyses or a combination of tests and analyses will be performed to demonstrate the ability of the equipment to perform their safety function in the environments that exist before and during the time required to perform their safety function.	A report exists and concludes that equipment listed as Class 1E in Table 2.4.14-1 are qualified to perform their associated safety function in the environments that exist before and during the time required to perform their safety function.

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