

## **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 Qualifications**

6.1 Components listed as Class 1E in Table 2.4.14-1 that are designated as harsh environment, will perform their function in the environments that exist during and following design basis events.

### **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**

Description	Tag Number <sup>(1)</sup>	Location	Seismic Category	IEEE Class 1E <sup>(2)</sup>	Harsh Environment
Hydrogen Sensor	30JMU10CQ001	Reactor Building	I	1 <sup>N</sup> 4 <sup>A</sup>	Yes
Hydrogen Sensor	30JMU10CQ002	Reactor Building	I	1 <sup>N</sup> 4 <sup>A</sup>	Yes
Hydrogen Sensor	30JMU10CQ003	Reactor Building	I	1 <sup>N</sup> 4 <sup>A</sup>	Yes
Hydrogen Sensor	30JMU10CQ004	Reactor Building	I	1 <sup>N</sup> 4 <sup>A</sup>	Yes
Hydrogen Sensor	30JMU10CQ005	Reactor Building	I	1 <sup>N</sup> 4 <sup>A</sup>	Yes
Hydrogen Sensor	30JMU10CQ006	Reactor Building	I	1 <sup>N</sup> 4 <sup>A</sup>	Yes
Hydrogen Sensor	30JMU10CQ007	Reactor Building	I	1 <sup>N</sup> 4 <sup>A</sup>	Yes
Hydrogen Monitoring Signal Processing Unit	30JMU10GH001	Safeguard Building	I	1 <sup>N</sup> 4 <sup>A</sup>	No

- 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.	<ul style="list-style-type: none"> <li>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.</li> <li>b. Inspections will be performed of the 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.</li> </ul>	<ul style="list-style-type: none"> <li>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.</li> <li>b. Inspection reports exist and conclude that the Seismic Category I equipment listed in Table 2.4.14-1 including anchorage is installed as specified on the construction drawings.</li> </ul>
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 or type tests and analysis 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.
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>

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

	<b>Commitment Wording</b>	<b>Inspections, Tests, Analyses</b>	<b>Acceptance Criteria</b>
6.1	<p>Components listed as Class 1E in Table 2.4.14-1 that are designated as harsh environment, will perform their function in the environments that exist during and following design basis events.</p>	<p>a. Type tests or type tests and analysis will be performed to demonstrate the ability of the components listed as Class 1E in Table 2.4.14-1 to perform their function for the environmental conditions that could occur during and following design basis events.</p> <p>b. Components listed as Class 1E in Table 2.4.14-1 will be inspected to verify installation in accordance with the construction drawings including the associated wiring, cables and terminations. Deviations to the construction drawings will be reconciled to the EQDP.</p>	<p>a. Environmental Qualification Data Packages (EQDP) exist and conclude that the components listed as Class 1E in Table 2.4.14-1 can perform their function during and following design basis events including the time required to perform the listed function.</p> <p>b. Inspection reports exist and conclude that the components listed as Class 1E in Table 2.4.14-1 has been installed per the construction drawings and any deviations have been reconciled to the EQDP.</p>