

2.4.7 Seismic Monitoring System

Design Description

1.0 System Description

The seismic monitoring system (SMS) produces a record of the vibratory ground motion from various areas of the plant during an earthquake so that features important to safety can be evaluated after an earthquake. The SMS is capable of sensing and permanently recording the absolute acceleration versus time.

The SMS in-structure instrumentation is placed at locations modeled as mass points in the building dynamic analysis so that the measured motion can be directly compared with the design spectra. Field mounted sensors of the triaxial type (i.e., three-directional, x-y-z axes) are rigidly mounted at the following locations:

- Free-field, if a suitable location is available.
- The primary containment structure (base foundation and two higher elevations).
- An independent Seismic Category I structure (foundation and higher elevation) not influenced by or connected to the primary containment structure.

2.0 Arrangement

2.1 The location of the SMS equipment is as described in Section 2.4.7.

3.0 I&C Design Features, Displays, and Controls

3.1 The SMS can compute the cumulative absolute velocity (CAV) on the PICS operator workstations and provides indication of the CAV in the main control room (MCR).

3.2 The SMS equipment has a dynamic range that allows measurement of the effects of seismic events.

3.3 The SMS equipment had bandwidth that allows measurement of the effects of seismic events.

3.4 The SMS equipment has a sampling rate that allows measurement of the effects of seismic events.

3.5 The SMS equipment has a trigger rate that allows measurement of the effects of seismic events.

4.0 Electrical Power Design Features

4.1 The SMS backup battery has capacity to power its instruments for continuous operation for a period of time.

Inspections, Tests, Analyses, and Acceptance Criteria

Table 2.4.7-1 lists the SMS ITAAC.

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	Commitment Wording	Inspections, Tests, Analyses	Acceptance Criteria
2.1	The location of the SMS equipment is as described in Section 2.4.7.	a. An analysis will be performed to determine the location of the SMS equipment. b. An inspection will be performed to verify the location of the SMS equipment is consistent with the analysis.	a. An analysis determines the location of the SMS equipment. b. The SMS equipment is located as per the analysis.
3.1	The SMS can compute the CAV and provides a display of the CAV on the PICS operator workstations in the MCR.	a. Type tests, tests, analyses, or a combination of type tests, tests, and analyses will be performed to demonstrate the SMS can compute the CAV. b. Tests will be performed using test input signals to verify a display of CAV is indicated on the PICS operator workstations in the MCR.	a. The SMS can compute the CAV. b. Displays of the CAV are indicated on the PICS operator workstations in the MCR.
3.2	The SMS equipment has a dynamic range that allows measurement of the effects of seismic events.	Type tests, analyses or a combination of type tests and analyses will be performed to demonstrate the dynamic range of the SMS equipment allows measurement of the effects of seismic events.	The SMS has a dynamic range of at least 1000:1 zero-to-peak and is able to record at least 1.0 g zero-to-peak.
3.3	The SMS equipment has bandwidth that allows measurement of the effects of seismic events.	Type tests, analyses or a combination of type tests and analyses will be performed to demonstrate the SMS equipment has bandwidth that allows measurement of the effects of seismic events.	The SMS has bandwidth of at least 0.2 to 50 Hertz.
3.4	The SMS equipment has a sampling rate that allows measurement of the effects of seismic events.	Type tests, analyses or a combination of type tests and analyses will be performed to demonstrate the SMS equipment has a sampling rate that allows measurement of the effects of seismic events.	The SMS has a sample rate of at least 200 samples per second in each of the three directions.

Table 2.4.7-1—Seismic Monitoring System ITAAC
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Commitment Wording		Inspections, Tests, Analyses	Acceptance Criteria
3.5	The SMS equipment has a trigger rate that allows measurement of the effects of seismic events.	Type tests, analyses or a combination of type tests and analyses will be performed to demonstrate the SMS equipment has a trigger rate that allows measurement of the effects of seismic events.	The SMS has an actuating level that is adjustable and within the range of 0.001g and 0.02g.
4.1	The SMS backup battery has capacity to power its instruments for continuous operation for a period of time.	A test will be performed to verify the SMS backup battery has capacity to power its instruments for continuous operation for a period of time.	The SMS has a backup battery that has a capacity for a minimum of 25 minutes of system operation.