Automation and Control, Monitoring

Monitoring is defined as the telemetry and ability to view what is going on within a given system. In some cases, monitoring systems can integrate and manage alarm and trouble signals from the monitored systems.

For the purposes of this section, control is defined as any device that directly regulates a change in state in a given system. Controls are an active system, and may be either:

- Manually initiated and automatically operated based on human input or decision
- Automatically initiated and operated based on a predetermined script or response to a failure or external change of state.

Operators should be able to respond to failures or to determine the loading or operation of their systems.

Monitoring is mandatory for all Classes with increasing levels of observation scope and granularity with increasing Class.

As Class level increases, monitoring increases by replacing summary alarms with individual alarm points and by presenting systems virtually for the system operators.
For Class F4 systems, a virtual single line, which clearly shows system loading and power flow, should be provided. In some instances, a simulator is also provided where changes of state can be tried in a virtual setting to see the outcome prior to employing them in the live, working environment.

Electrical systems should disclose all changes in state, alarms, pre-alarms and positions of all breakers, and switches as well as general system information.

Power quality monitoring (PQM) for data centers is recommended since IT systems may be sensitive to power quality, transients, harmonics, and other types of waveform disruption.

Power monitoring is also vital as waveform disturbances offer a precise definition of experienced failures and outages. When addressing power system monitoring, there are three facets of observation:

- Power levels noting voltage, current, and frequency
- Harmonic content
- Waveform imaging and capture

Power monitoring offers a sampling of the power system’s quality in a manner like a mechanical system’s
monitoring of temperature or water chemistry to the chiller/cooling system.

PQM should be located at portions of the electrical system that offer a complete view of the vital locations where power is being converted.

No favor is made over switchgear-integrated monitoring or stand-alone systems. The key element is how they are used.

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