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Mark Feasel
Director



the global specialist
in energy management



Power Metering for Operations and Maintenance

Metering to comply with EPACT is just the Tip of the Iceberg

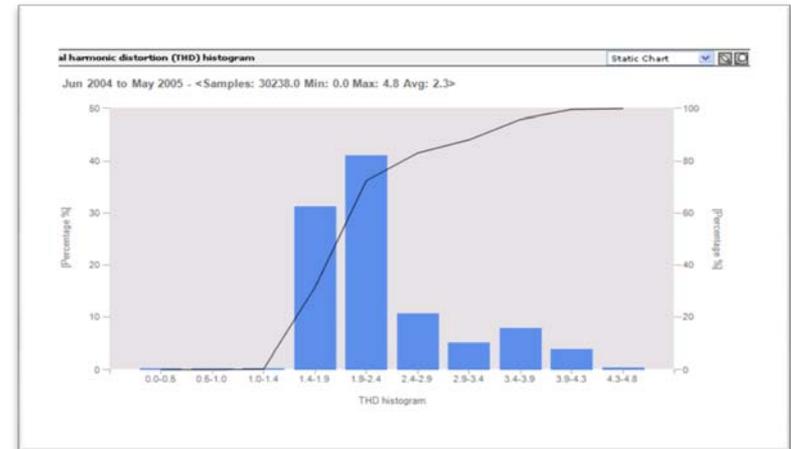


Optimizing Equipment Utilization

Investments in energy efficiency and renewable energy can result in the installation of electrical equipment (such as drives and inverters) that create power harmonics in your electrical distribution system.

➤ Power Quality monitoring can help you understand the affects of harmonics including:

- Increased losses in the core of AC motors and transformers that can have a significant affect on operating temperature and equipment life.
- Torsional oscillation in motor shafts resulting in harmful vibration
- Damage to capacitor banks
- Cable insulation breakdown



Operational Efficiency Case Study – Kennedy Space Center

Key Facts

In addition to energy conservation and cost allocation, the PowerLogic system is used to:

- ❑ Prioritize load shedding during Utility outages
- ❑ Facilitate large motor “soft start” when on generators
- ❑ Provide “actual” power parameters vs. theoretical parameters for system modeling.



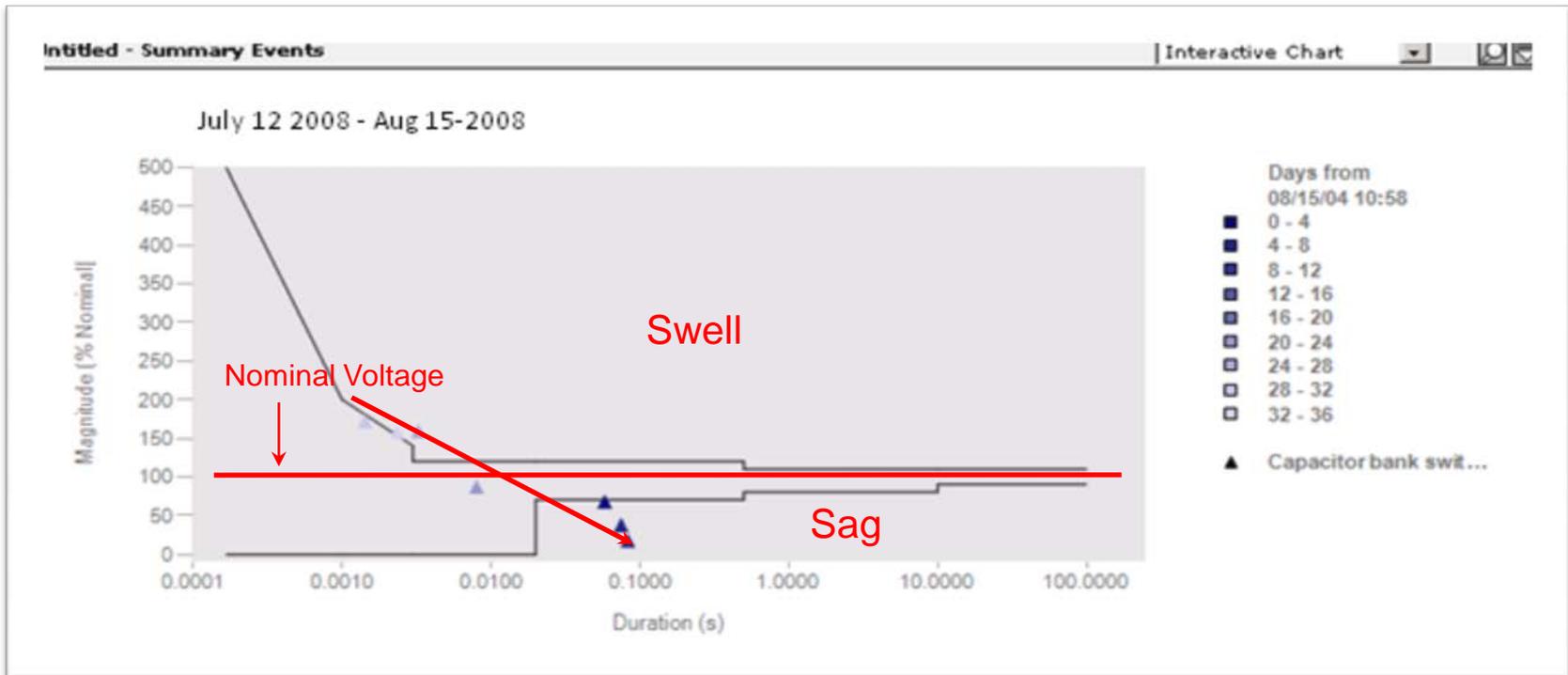
“Some of the initial usage would be where we had a facility outage and we needed to size a backup generator. Rather than shotgun it, now people were realizing they could go and get the trended data on what the real generator size should be”

-Dr. Chris Iannello, Shuttle Program Energy Manager

Improving Reliability

Metering can help you minimize the frequency of unplanned outages

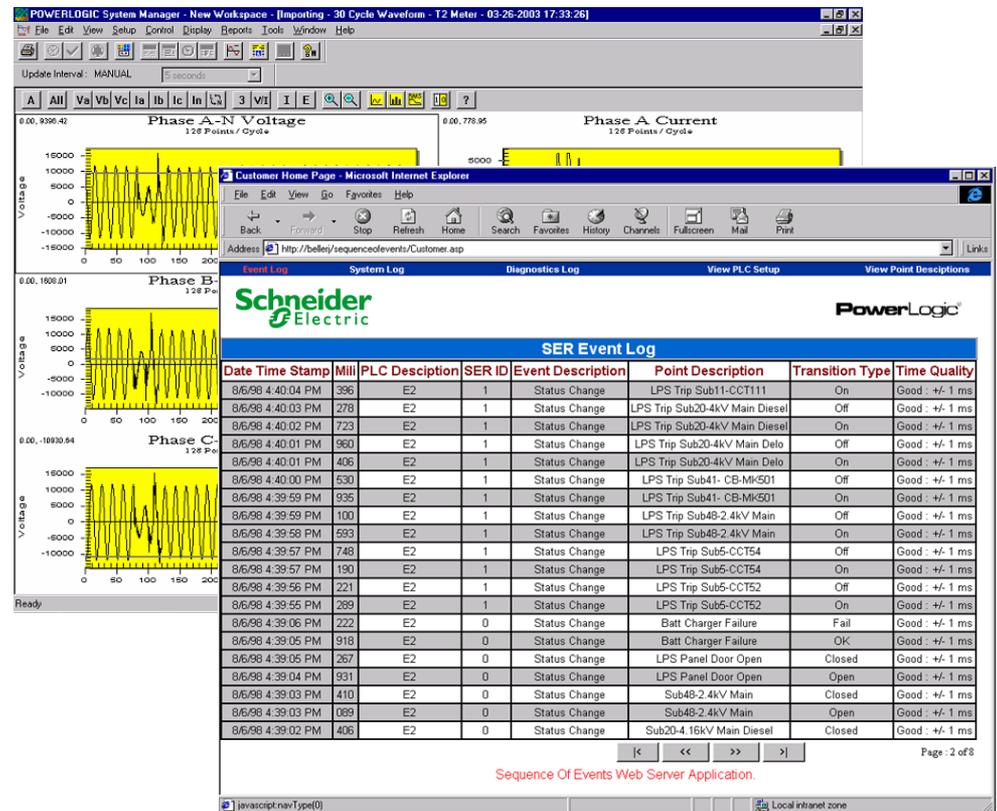
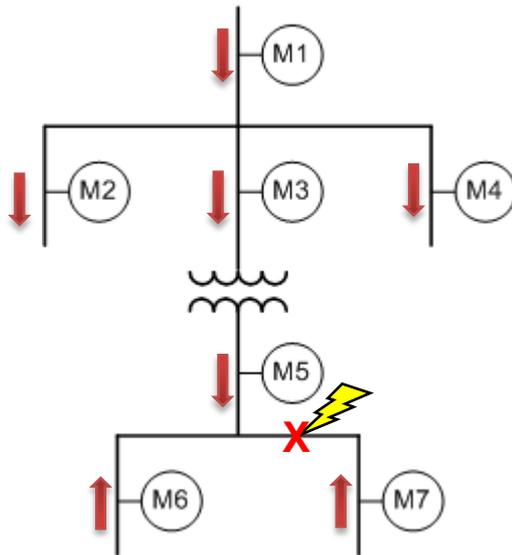
- ❑ Understand the affect of voltage excursions on sensitive equipment



Improving Reliability

Metering can help you minimize the duration of unplanned outages

- ❑ Meters determine direction to fault
- ❑ Waveforms documented for forensic analysis
- ❑ Time Stamps aligned and recorded for Sequence of Event and Root Cause Analysis



Reliability Case Study: Edwards Air Force Base

Key Facts

- 470 square mile facility
- \$20M annual electrical costs
- Power Monitoring helps them avoid ~5 outages per year at an annual savings of over \$1M



“Before we had the PowerLogic system, we were experiencing widespread power outages. Power mains were opening at the switch stations, and we didn’t really have the data to analyze why that was happening. Typically someone would just go out and inspect the feeders. But without having any data to analyze the sequence of events and fault currents, we really did not have any way to determine what needed to be changed to prevent additional power outages.”

- Ron Ryan, SCADA Systems Manager

Advanced Metering for Advanced Applications

- **Electricity travels (and changes) at the speed of light.**
 - **High speed sampling** is required for Power Quality diagnostics
 - **Accurate onboard time stamping** is required for root cause analysis

- **Electricity is a very complex data type**
 - There are hundreds of ways to describe aspects of a single waveform (1/60th of a second). Therefore data about the waveform is complex and expansive.
 - **Multiple communication protocols and ports** for different stakeholders. (SCADA, Electrical Engineering, Energy engineering, accounting, etc.)
 - **I/O** to bring in status about other relevant events. (Breaker status etc.)

- **Power Monitoring is most important when the commodity it measures is failing.**
 - **Onboard data storage** is required to account for network communication outages
 - **Permanently installed** metering will enable you to take advantage of all of the benefits.

Thank you for your attention!



Questions?

Contact

Mark Feasel

Director

Schneider Electric Energy Solutions

mark.feasel@us.schneider-electric.com

www.powerlogic.com