The Value of Technology

Klickitat PUD Uses the SENTINEL® Event Recorder Feature to Diagnose Outages

Benefits SENTINEL meter event recorder provided how many outages had occurred, when they occurred, and how long they lasted.

SENTINEL meter data was accurate within seconds.

Using the SENTINEL meter data we could identify which breakers were tripping.

SENTINEL meter gives us flexibility to add features other than revenue billing to even our smallest 3-phase accounts.

background

The Background

Klickitat PUD is a public utility district created by a vote of local citizens in 1938. Headquartered in Goldendale, Washington, we have worked for more than 60 years to meet the growing energy needs of the residents of Klickitat County in south-central Washington. After more than sixty years, the PUD serves 10,750 customers with 1,600 miles of line and facilities valued at $78 million.

We have all Itron VECTRON® meters installed for our 3-phase customers. Last fall, we were introduced to the SENTINEL meter through a promotional campaign and decided that it was time to upgrade from VECTRON meters to SENTINEL meters.

The cost per feature and the performance available in the SENTINEL were drivers that we used to convince management that now was the time to invest in this upgrade.

The following features were of particular interest to us:

> Event Recorder—We are attracted to the Event Recorder because our service area is rural, and we have a lot of older devices that do not give us the information that we need when a fault happens.
> Time-of-Use version—Some of our accounts require a TOU rate schedule. We also use the TOU meters real-time clock to store multiple self-reads on predetermined dates. Using the meters auto demand reset allows us to read the meter when our schedule fits. The TOU version clock also maintains dates and times on events after a power outage.
> MeterKey™—With the MeterKeys, we can reduce our inventory and still have the functionality we need. We can even upgrade the meter on site as needed, saving the time and expense of removing and replacing a meter.

The SENTINEL meter's event recorder determined critical outage information at an irrigation customer site saving the time and expense required to isolate the problem.

application

Application

We recently had one of our irrigation customers call in to say he was out of power. We investigated the cause of the outage, but this distribution feeder in the substation had non-intelligent recloser controls so we could not determine anything about the outage, such as when it occurred, length of outage, or operating sequence of the recloser. We eventually located a section of faulted underground line after several attempts to isolate and re-energize.

Another customer on the same feeder had also called in—his pumps were shutting down on him. About a week earlier, this same customer had complained about his pump shutting down and suspected voltage problems. We had installed a voltage recorder at that time. We interrogated the voltage recorder and found that voltages over the last week looked good. We also discovered that we forgot to enable the voltage recorder's event function. Fortunately, at this customer's site, we had recently upgraded the billing meter to a SENTINEL TOU meter and had activated the internal Event Recorder. Within minutes, we were able to interrogate the meter and determine how many outages had occurred, when they occurred, and how long they were.

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Results

The SENTINEL information was accurate within seconds. This customer's meter had recorded all the faults and attempts to isolate the faulted line we were working on. The SENTINEL meter recorded these events as short duration sags or outages. Since we knew the times of the last several faults on the faulted line we had refused, we were able to compare them with the SENTINEL meter's event recorder. We now knew that this customer's pump was shutting down every time it saw a fault somewhere else on the same distribution feeder. After inspecting the electrical equipment, we discovered that this installation was using a phase loss relay with a time delay setting that was too fast to ride through the sags caused by the nearby faulted underground line.

Further investigation of the SENTINEL Event Recorder showed some older outages that could not have been related to the underground outage we were working on. The owner of this site confirmed that the dates and times recorded on the SENTINEL event recorder agreed with what he had recorded for pump outages. Taking these meter records with me back to the substation, I was able to better investigate the situation by matching the SENTINEL meter data to the recloser information, identifying which counters were tripping. We could determine which breakers had tripped and when it had operated. At this time we also became aware of some intermittent operations on another substation feeder not related to the underground fault we just worked on.

Future Plans

We had previous experience with the Itron, Inc. QUANTUM® Q1000 meter in our substations and large generation accounts and were impressed with its capabilities. Several years ago, we also purchased the EnergyAudit™ software to allow us to auto dial our Q1000 meters and upload data. We have continued to fine-tune what data we receive and are finding the event and power quality features to be very useful.

Until introduction of the SENTINEL meter, we thought event and power quality features would be restricted to substations and our largest accounts. The SENTINEL meter now gives us the flexibility to add features other than revenue billing to even our smallest 3-phase accounts.

We are continuing to explore how to use some of the SENTINEL meter's new features. Included in our current plans are:

> Program "Phase Loss" and "Outage" events in all future 3-phase accounts to augment our troubleshooting in the field.
> Install SENTINEL meters with internal modems at larger accounts and critical locations in our distribution system.
> Offer Load Profile recordings of data and power quality to our larger accounts. Post data on a web site or provide customer with read only software.
> Ability to offer customers a range of independent outputs for load management.
> Use the Register Full Scale and Demand Threshold functions to alert us when sites have potential overloading of Meter, CT's, Transformers, or site wiring.
> Monitor other events such as Low Battery or TOU Schedule Errors that would cause billing problems.
> Use the Phone Home on Event with EnergyAudit to monitor important events on our modem equipped meters.
> Increased accuracy of the SENTINEL meter helps us justify its use.

This story, written by Rick Pimley of Klickitat PUD, first appeared in the Itron (formerly Schlumberger Electricity, Inc.) customer magazine, Systems Watch Fall 2003.

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