

From: The PJM MTF Team

To: The MTF

Date: 5/25/2016

Subject: May to June Interim Update, Included Measurements in Requirements

In an effort to efficiently communicate the latest developments and enable MTF participants to consider their stance and support between MTF session, this letter is to clarify the latest developments in the MTF consolidated package since the May session.

Background

The primary challenge for the MTF has been accuracy requirements. Actual accuracy of any metering or measuring* system is a complex equation involving component design with dynamic performance curves, variable expected loading of equipment with certain targeted ranges for accuracy, and design and installation details such as turns ratios, wire lead lengths and burden.

The challenge is two-fold because the components and maintenance of metering and measuring systems are tremendous capital investments for some members. Therefore all new and clarified requirements must be considered against the immediate and long-term cost and impact to members.

This is done primarily by determining to the best extent possible the reliability and market impact of the varying target accuracies on PJM operations and markets.

The MTF has possibly achieved a sufficient level of consensus on the issue of accuracy by balancing expected costs, considering present utility design standards, grandfathering existing equipment where appropriate, protecting the needs of PJM EMS and Markets and NERC standards, and correcting Manual 01 language to be comprehensive and clearly organized.

Issue

One topic missed during the bulk of the discussion has been what telemetered values apply. PJM receives over its ICCP and DNP links real-time data for MW, MVAR, kV, frequency, current, CB state, and transformer tap setting. Topics on metering and measuring accuracy has been about general accuracy. So it is ambiguous if that means just MW, or MW and MVAR, or all analog values.

Considering the prevailing goal to fix M01 – to make it clear, unambiguous, and comprehensive – it should be a goal of MTF to make a frame work that includes all telemetry data that might be measured and supplied to PJM. In particular, in addition to MW and MVAR, kV and frequency have significant impact on critical PJM EMS applications such as State Estimator. Because of this, the considerably detailed defenses presented by PJM on why metering and measuring accuracy needs a guaranteed minimum accuracy applies for these analogs in addition to MW and MVAR.

The question then becomes how can these data points be added to the requirements framework in a cohesive and expected manner.

Solution

Using the framework already agreed upon by the MTF, new requirements or requirements that at least can reasonably be construed as new or redefined are to be grandfathered, meaning all existing equipment is compliant with the PJM Manual. This neutralizes immediate compliance and cost concerns. Grandfathering is complimented by PJM activities that may identify and address areas of special concern in regards to telemetry accuracy.

For the accuracy of individual current and voltage, consider that for any MW or MVAR it is required to measure the current and voltage. Any calculation of accuracy will conclude that the inaccuracy of any component adds to the overall system inaccuracy. So under ideal conditions it can be expected that any systems providing MW and MVAR at accuracy x would have access to voltage and current measurements less than x . Therefore it seems safe that the voltage and current accuracy requirements can match the MW and MVAR requirements without being onerous.

The counterpoint is that the telemetered voltages and currents may not be coming from the same meters or devices that are providing MW and MVAR, including the source CT or PT/VT. Therefore it is not a given that within the same substation voltage/current will meet accuracy requirements even if MW/MVAR do.

To address this concern it is suggested that voltage/current be grandfathered, covering any cases where a separate voltage or current instrument transformer and transducer is used and could expose equipment owners to an undetermined risks. This should lower risk for members and provide guidance of design for future installations.

For the purposes of making sure all PJM requirements are value driven, voltage is given the most explicit treatment, for the reason that voltage is key component of the PJM EMS State Estimator solution. Current or amps is only mentioned for the purposes of making M01 comprehensive, and the requirements are “mutually agreed upon”.

Frequency is again unique because it is explicitly mentioned in NERC BAL-005-2. This standard is for the system operator (PJM in that context). PJM owns and operates more than one high-accuracy frequency measuring devices for operation purposes making BAL-005 R17 applicable. Since the primary and several backup devices are located at PJM, the frequency signals provided by members, in particular TOs, do not fall under NERC BAL standards for accuracy. Therefore PJM will like out that the PJM devices have to meet the NERC standards, while the TO provided data does not and can likewise be mutually agreed upon as far as accuracy is concerned.

These proposed amendments are captured in the MTF Options & Packages Matrix under Addendum A. These changes are meant to help the MTF meet the goal of making M01 metering requirements comprehensive and arranged such that there is very likely one requirement set for any given markets or

operations telemetry, even where the requirement is simply “mutually agreed upon” performance, making the Manual unambiguous. By grandfathering the voltage requirements and limiting the current requirements proportional to the data usage, impact and risk to equipment owners should be manageable.

**Note that one of the big knowledge gaps that was bridged at the MTF was most real-time data supplied to PJM by members does not come from actual meters but other devices that also measure current and voltage to calculate MW and MVAR. This makes the word “meter” problematic, as discussed at great length. The topic is resolved here by referring to any device that measures, ostensibly including relays, transducers, RTUs, etc.*