

# Combining Best Practices In Staffing, Technology and Procedures Pays Off

by **Ardis Bartle, PGAS Systems**, A Division of **Hanover Measurement Services Company, LP**, Houston, TX

**G**ood gas measurement can make the difference between breaking even and making a profit whether a company is a producer, a gatherer, or an interstate or intrastate pipeline.

According to an Arthur Andersen study, leading pipeline transportation companies are controlling lost and unaccounted for gas (L&U) at an average rate of 0.25% or less of custody receipts. And, because customer and investor expectations are more stringent today than they have ever been, producers and pipelines have to do a better job with fewer resources. In these circumstances, good measurement is a combination of "best measurement practices" that can directly impact the existing measurement system, and ultimately, the bottom line.

## Defining Good Measurement

Good measurement is defined as understanding well the basic gas laws and standards that relate to proper equipment and procedures in order to achieve and maintain a high level of measurement accuracy. All meters should be considered as a company's cash registers.

In many cases, additional tools are needed to ensure measurement accuracy. It is not enough to install charts or electronic flow meters (EFMs) at the measuring sites, and then transfer the data to the corporate office on spreadsheets for balancing. SCADA systems rarely provide both the SCADA and gas measurement functionality such as historical audit requirements needed in a corporation.

Off-the-shelf gas measurement systems provide measurement departments the ability to minimize efforts at closing each month. Finally, the gas marketplace is moving from a monthly measurement cycle to a daily cycle; soon, that cycle will be hourly. More speed and accuracy than ever before will be required.

The need for good measurement practices requires expertise and knowledge in both the field office and corporate office. In cases where the field office has "ownership" of the measurement data, the abil-



ity to work with the corporate office is essential. A good measurement system can identify problems. These can then be addressed by the field and corporate offices together as a team.

## Distinction Between Field, Corporate Office Procedures

With today's technology, communications and EFMs, capturing information electronically at the source and transmitting it to multiple users and systems, the importance of field personnel tasks has heightened.

Field procedures today should focus on "managing" the meters based on quality and accuracy. Every meter — whether gas volume or quality — should be the responsibility of a field engineer. The field engineers gather, review and edit measurement data for further use in volume reporting, pipeline system balancing and invoicing. Good field measurement procedures include:

- Standard work management system for operating gas wells.
- Data transferred from field to the corporate office should be accurate and timely.
- Ensuring that meters will not be turned on until they are inspected and input into the system.
- Semi-monthly calibration of meters with measuring volumes greater than 20,000 Mcf/d. Monthly to quarterly calibration of all meters with less than 20,000 Mcf/d.
- All field testing equipment should at least be as accurate as the meters they are testing.
- Gas meter wells should be accurately mapped and the meters should be accurately coded.
- Companies should implement standard field procedures to instill a culture of responsibility for every meter.
- Scheduled regular meter test inspections of gas meters.

The corporate office must also have procedures in place to ensure the accuracy of the data being used for gas measurement. These procedures can be overwhelming or minimized, based on the gas measurement system in place. The minimum requirements for an off-the-shelf gas measurement system should include data validation, volume reporting and editing, gas quality and editing, historical audit tracking, chart integration, EFM volume calculation and pipeline system balancing. Good measurement practices should include:

- Review data daily, as it comes in, not at the end of the month.
- Identify missing data volumes daily, not weekly or monthly.
- Use alarms and flag functions to help automate the data validity checks.
- Test the data automatically as it arrives using validity checks. This minimizes the number and size of prior period adjustments (PPAs).
- Identify via reports delinquent gas samples and meter tests.
- System balancing should be performed in MMBtu, not Mcf.
- Calibrating composite variances from meter test inspections.

## How Field & Corporate Offices Work Together

Measurement expertise and responsibilities in companies vary between the field

office and the corporate office. Some companies assign many measurement responsibilities to the field level (a decentralized approach), while other companies have centralized their measurement at the corporate level. No matter what approach a producer or pipeline has taken, every employee needs to understand that the meter station on the pipeline is the organization's cash register.



Technology has not reduced the need for manpower in field offices. In fact, the same level of manpower is required today but with a higher skill level. Field personnel best understand the measurement process and can ensure the accuracy of the data.

Corporate and field groups benefit from the availability of data in the form of reports and exception tables. The challenge for corporate and field groups is that meter data is now being reported and traded daily, if not hourly. Both groups must work closely together to identify areas in the company that would benefit from improved measurement practices. Below are some examples of how good measurement practices benefited a company in both timeliness and accuracy:

**1. Missing Data Volumes:** Field offices need to be notified within a certain amount of time (can be within an hour of not receiving the data) that gas measurement volumes are missing. In the past, the corporate office notified the field office immediately via e-mail or via report. With a gas measurement system accessible to both the field and corporate office, a report or exception table can be accessed immediately to identify what data is missing. The field personnel can ascertain if the data can be retrieved, and if not, the measurement system can estimate the missing data until settlement data is available.

**2. High and Low Alarms For Static Pressure, Differential Pressure, Temperature, and Volume:** If the corporate office is constantly getting alarms in one or more of these areas, this could signal a problem with the gas meter well, which can be communicated to the field personnel. Again, with a gas measurement system accessible to both the field and corporate office, a report or exception table can be accessed immediately to identify what high and low alarms have exceeded their limits. The field personnel can work closely with the corporate group to determine if limits have been correctly defined, or if a problem exists in the actual field equipment and how best to resolve it. Good measurement practices would

include procedures on how to resolve alarm issues.

**3. Events and Logs:** Corporate can view events and logs that occur out in the field that may need to be verified by field personnel. Events such as "Failed Analog" to "Orifice Plate Change" can affect the accuracy of the gas measured. A report can easily be made available to the field on a daily basis that will allow them to review and inspect events that occurred in their area.

**4. Meter Test Inspections:** Field personnel conduct meter test inspections and document changes that have occurred to their wells in the field. By taking the meter corrections identified in the field and sending them back to the corporate office, the measurement data of the meter could be adjusted, based on the series of tests conducted.

### The Cost Of Doing Nothing

Measurement errors can mean the difference between breaking even or earning a profit. In many organizations, it is difficult to determine which individuals are responsible for measurement, either in the field or in the corporate office. Also, many companies have a combination of tools to accomplish their measurement goals.

Measurement errors occur because organizations tend to repeat the same errors without addressing, reviewing or updating their good measurement practices. Recognizing measurement errors that provoke audits and/or cost money should be an ongoing task between field and corporate offices.

The majority of the errors listed in Table 1 can be prevented, or resolved with close teamwork between corporate and field personnel and a good gas measurement system. Typical measurement errors fall into two categories: inadvertent errors and discretionary errors. Both occur in the field as well in the office.

Finally, the key to a good measurement practices is having the proper tools with which to review and edit the data. Physical gas measurement systems must be both complete and user friendly. To

Table 1.

## Frequently Found Measurement Errors

- Missing data
- Low delivery of data to the system;
- Incorrect configuration of EFM device;
- Wrong specific gravity and/or Btu;
- Calibration error corrections;
- Improper size plate utilized (too small or too large);
- Meter freezes;
- Editing methodology;
- Contractual compliance of calculations;
- Contractual compliance meter calibrations and sample frequencies; and
- Outdated gas quality information.

be complete, they must be able to accomplish the following:

- Balance and report on a segmented basis;
- Include all measured and unmeasured gas for;
- Custody receipts and deliveries;
- Check measurement receipts and deliveries;
- Company used gas;
- Linepack changes;
- Shrinkage;
- Associate and report MMBtu and Mcf on all stations;
- Perform recalculations and comparisons as preset;
- Flag and report all out-of-norm conditions; and
- Control against missing and erroneous data.

To be user friendly, it must allow full access for inquiry and error report analysis to all measurement technicians, as needed.

A wise organization will begin investing toward good measurement practices by training, having the proper tools, and using teamwork between field and corporate office to identify possible errors and problem meters.

Organizations that view gas measurement systems as a technology that is a "must have," rather than "a nice to have," are making a commitment to further implementation of good measurement practices. Searching for best-in class technologies, training people to use them, and developing processes around good measurement practices ensure that the organization reaps the maximum benefits from the investments. **P&GJ**