Understanding the gas measurement audit process

The potential negative impact of an audit can be minimized with proper documentation and up-to-date measurement systems.

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In the natural gas industry, if you ask different people the definition of the term "audit" you may receive different meanings. The differences usually relate to each individual's experience with measurement processes. For gas measurement, there may be several audit types or classifications. There are audits of third-party service providers, internal audits, audits performed by customers and by regulatory agencies, and audits performed by service providers for customers.

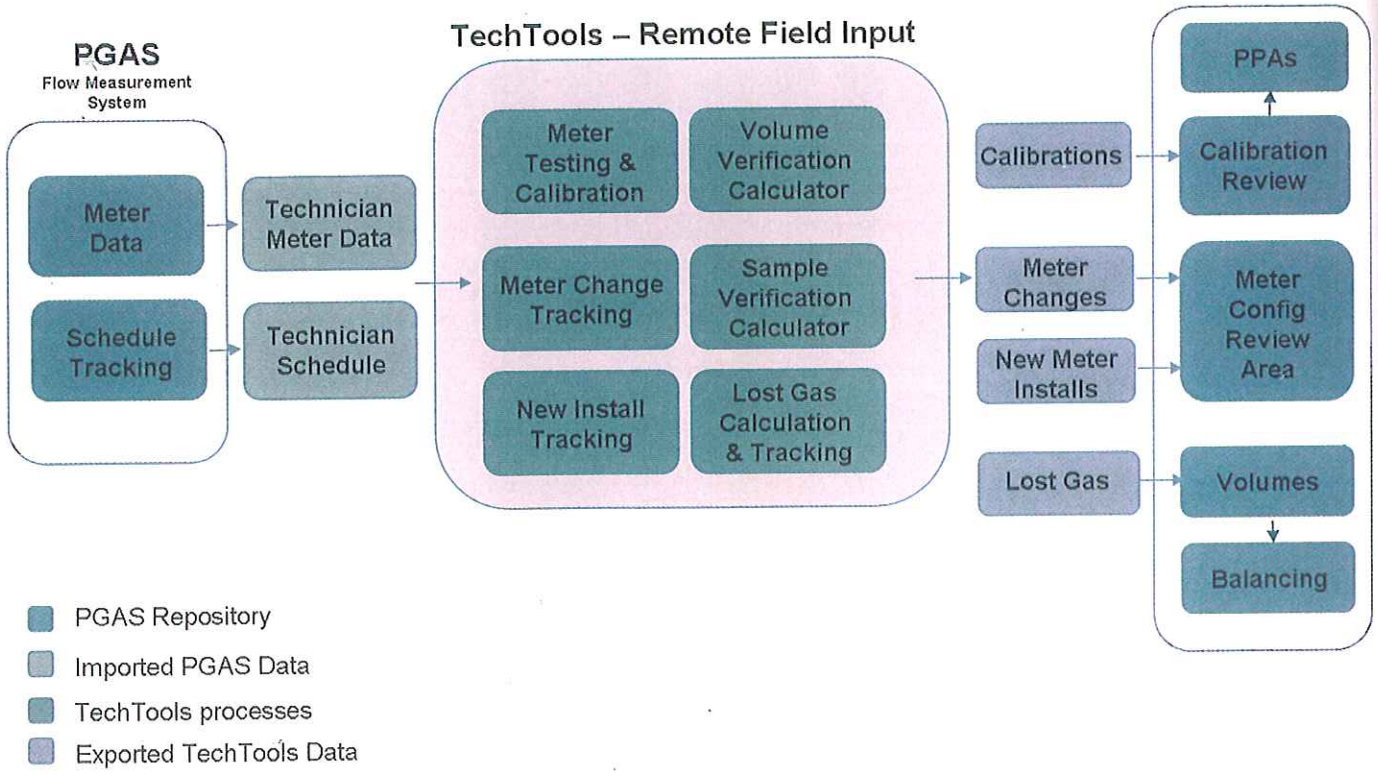
Price trends and audits

Audits have become more prevalent as the value of natural gas has increased. Prior to the mid-1970s, wellhead natural gas prices were pennies per thousand cubic foot. Beginning with the seventies energy crisis, prices increased steadily until reaching $2.50 in the mid-80s. The mid-90s saw prices become volatile, until they skyrocketed to $8 and above. Although less now, the value of gas will remain much higher than pre-70s prices.

High gas prices create expectations for increased measurement accuracy and reporting integrity. These expectations are being met using improved technology, improved measurement standards, and increased auditing. Unfortunately, new technologies and standards changes, along with volatile business environments, help fuel the need for audits. Until a technology is mature and standards are well understood and implemented, a lack of confidence can exist in measurement processes.

Sarbanes-Oxley and audits

Audits are a fact of life. On July 30, 2002, President George W. Bush signed the Sarbanes-Oxley Act (SOX) into law. Although most SOX provisions are mandatory only for public companies



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that file a Form 10-K with the Securities and Exchange Commission (SEC), many private companies are facing market pressures to conform to the SOX standards. Now, companies must not only address direct, customer-initiated audits, but must also have processes in place to facilitate compliance with SOX guidelines. Initially, SOX places an additional burden on companies, but there is an up-side. SOX compliance forces a company to comprehensively understand and monitor its business processes. Doing so provides a means to continuously improve processes, add value to process outputs, reduce the need for unscheduled audits, and make scheduled audits less disruptive. Figure 1 provides an example of a SOX process flow diagram with control references.

Comprehensive audit considerations

In order to be prepared for external audits, internal audit programs are advised. A comprehensive internal audit should examine all measurement processes.

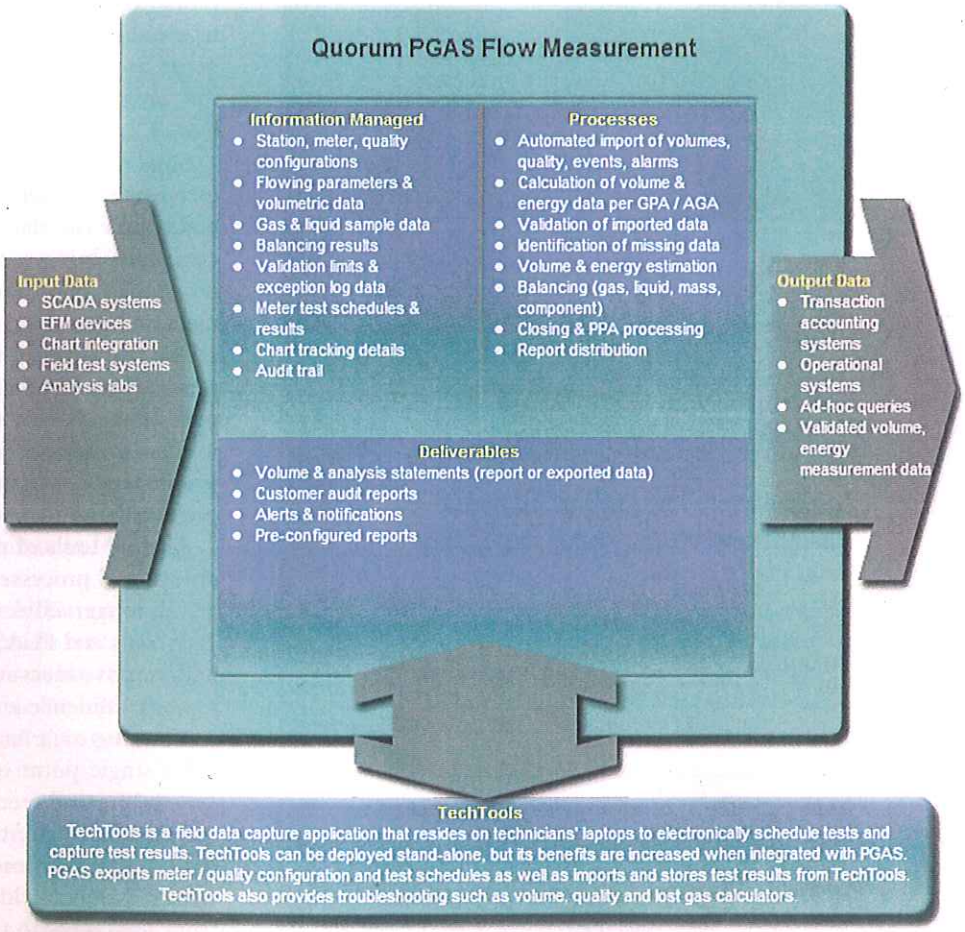
Measurement processes include:

- Asset configuration and management – Life cycle management of measurement assets from design, installation, and commissioning to inactivation and removal.
- Data collection – Retrieval of asset data throughout life cycle, including geographic, configuration, and fluid quantities data.
- Volume and energy calculations – All calculations affecting quantity and quality.
- Data processing – Entry of asset-sourced and asset-related data into a computer.
- Reporting – Generation and distribution of reports and files to internal and external customers.
- Data management – Administrative process by which the required data is acquired, validated, stored, protected, and processed, and by which its accessibility, reliability, and timeliness is ensured to satisfy the needs of the data users.

Processes exist in both field and office environments and will have various inputs, ranging from safety and operations to contractual and regulatory requirements. Measurement process outputs are data; data transformed into information for transactional quantification, regulatory compliance, operations control, and business management. Qualifiers describing these data include: accurate, complete, timely, and available. Deficiencies in any of these data qualifiers can trigger an unscheduled audit.

Improvement tools

Understanding measurement processes is important, but proper tools are required to improve processes and meet changing process requirements. These tools serve the measurement processes and include metering, recording, data capture, data transmission, data processing, data reporting, and data management. Tool requirements have changed as data accuracy and reporting requirements have changed. Prior to 1980, many pipeline transmission and gathering companies segregated meter data into two types: real-time (operational) and historical (transactional). Real-time data was used for monitoring and controlling the pipeline, while historical data was used for monthly contractual settlements between service provider or purchaser, and customer. The two data



PGAS helps companies become proactive in process management and problem resolution by validating measurement data upon import, entry, or edit within the system.

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types were considered completely separate and were served by two or more data streams.

There was duplication of equipment, personnel, and processes. Real-time data was isolated to the SCADA system that collected it. Historical data was recorded and passed along its data path on paper, beginning with paper chart recorders and ending with chart integration and processing into mainframe computers. Maintenance activities were also recorded on paper and manually keyed into these same computing systems or stored as paper forms in filing cabinets. Finally, all the historical data was processed and paper volume statements printed and mailed on a monthly basis. Access to data was limited and auditing tasks were simpler, although more labor intensive.

Some improvements were made in the recording and transmission mediums of historical data as PCs became more powerful and available. Low-cost flow computers were experimented with, but the real-time and historical data processes were fundamentally separate and unchanged. Instead of recording some measurement data on paper, it was manually keyed into electronic spreadsheets, multiple times, before being processed and reported. Audit tools included the same mediums of paper and spreadsheets with lots of manual review.

Since then, and especially after the start of gas price increases in the late 90s, technology has improved to make these two data types less distinguishable. Today, companies bring in both SCADA and historical data with less duplication of effort, sharing the same equipment and personnel resources from meter to database server. Massive amounts of data are now available for processing and validation. Although the basic goals of a measurement audit have not changed, the technologies used to generate measurement data have changed audit procedures and changed expectations of how data is presented and reviewed.

The old tools of paper forms, electronic spreadsheets, and processes that require duplication of efforts are no longer valid. New tools, such as Quorum's TechTools and PGAS, provide the means to monitor and improve measurement processes, increasing customer confidence and making audits less painful.

Running on a technician's laptop, TechTools provides single-point-of-entry technology for automating scheduling and recording of all measurement asset maintenance activities. Automatic validation ensures data is complete and accurate for user-configurable, required-input fields. Direct transmission of data from TechTools to the PGAS enterprise database eliminates data entry duplication and reduces manual entry errors.

PGAS is the enterprise-wide repository for all volumetric, quality and master data. Objectives of an enterprise flow measurement system include:

- Standardizing corporate-wide measurement processing in response to diverse and evolving operational environments.
- Normalizing and recalculating measurement data when field conditions cannot meet contractual requirements.
- Facilitating interaction and communication between field operations and central office measurement.
- Facilitating measurement and control of key performance indicators such as data edits (current period and closed period) and lost-and-unaccounted-for (L&U) gas.
- Creating customer value by reducing data errors while increasing availability and access.

PGAS helps companies become proactive in process management and problem resolution by validating measurement data upon import, entry, or edit within the system. Extensive data validation parameters and settings, coupled with a robust exception reporting function, allow system operators to stay on top of data issues. Hierarchical balancing with graphical representation can be configured for volume (gas or liquid), energy, or compositional reporting. Configurable statistical estimation allows automated balance meter volume population for low-flow and steady-flow locations. Estimating volumes for these types of balance meters provides an additional validation and troubleshooting tool. Estimates are replaced when metered data is imported.

PGAS data makes auditing less painful by making data more accessible. Because the data is stored in an SQL database it is available on demand, via system reports and using standard query tools. Since this system utilizes Microsoft's .NET framework, data is more easily available to customers via the internet. Providing customers with near-real-time data helps facilitate early problem resolution and increases customer confidence.

Furthermore, PGAS reduces business disruption during an audit by providing a complete audit trail. All operational and transactional activities within the application are recorded, saved, and available for reporting. Activities are easily viewed via standard reports or from ad-hoc queries.

Conclusion

Measurement audits are not going away. But by understanding, documenting, and maintaining good measurement processes, policies, and procedures, and by applying good tools, negative audit impacts can be minimized. ■

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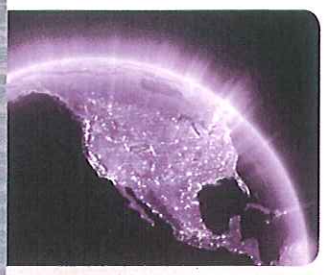

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