

## Measurement Policies and Procedures – Development and Implementation Considerations

Class # 8230

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### INTRODUCTION

With proper consideration and with buy-in from stakeholders, well designed and documented measurement practices help reduce company costs. Cost reductions include those associated with Lost-and-Unaccounted-for (L&U), asset maintenance, and labor. Furthermore, good measurement procedures help employees perform safely and effectively and help support stable, predictable measurement processes.

In this paper, we will discuss:

- What happens when measurement practices are not effective?
- What are the metrics to determine if measurement practices need improvement?
- Why do policies and procedures fail?
- When should policies and procedures be reviewed and updated?
- Who is responsible for creating and maintaining policies and procedures?
- How do policies and procedures get effectively communicated?

It is important to understand that business processes are not static and are subject to changing environments. Without this understanding, measurement policies and procedures can become outdated, lose effectiveness, and eventually become counter-productive. Periodic review of measurement processes, a way to determine policy and procedure effectiveness, and a mechanism to adjust measurement policies and procedures for any applicable process gaps are important considerations.

### WHAT ARE POLICIES AND PROCEDURES?

*Policies tell us what to do.* They are principles, rules, and guidelines formulated or adopted by an organization to reach its long-term goals. They are designed to influence and determine all major decisions and actions. All activities take place within the boundaries set by policies.

*Procedures tell us how to do it.* They are the specific methods employed to express policies in action in day-to-day operations of the organization. Together, policies and procedures ensure that a point of view held by the governing body of an organization is translated into steps that result in an outcome compatible with that view.<sup>1</sup>

Policies and procedures do not exist by themselves in isolation. They should have purpose and ultimately support an organization's vision, mission, core values, and processes.

As an example:

If your company's *mission* is:

Be a product centered software services organization with a *vision* of:

Being a global organization delivering the highest quality software and services to clients, and with core *values* of:

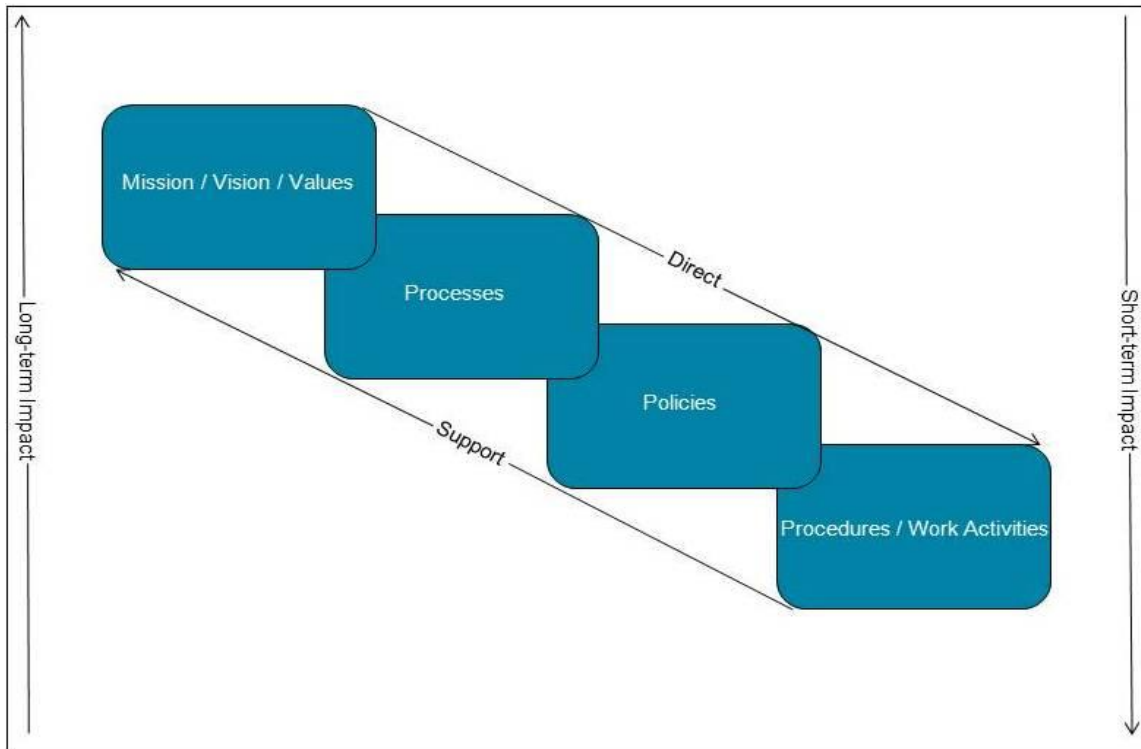
- 1) Stay committed to client success
- 2) Be the best workplace for first-class people
- 3) Operate ethically with long-term focus

Then your *policies* and *procedures* should reflect and support these ideas.

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<sup>1</sup> *BusinessDictionary.com*. March 10 2010. < <http://www.businessdictionary.com/definition/policies-and-procedures.html>>.

It would not make sense, in this case, to have a hiring policy without an effective evaluation procedure to determine a prospect's fit within the organization.



### **WHAT IS A BUSINESS PROCESS AND HOW DO POLICIES AND PROCEDURES SUPPORT IT?**

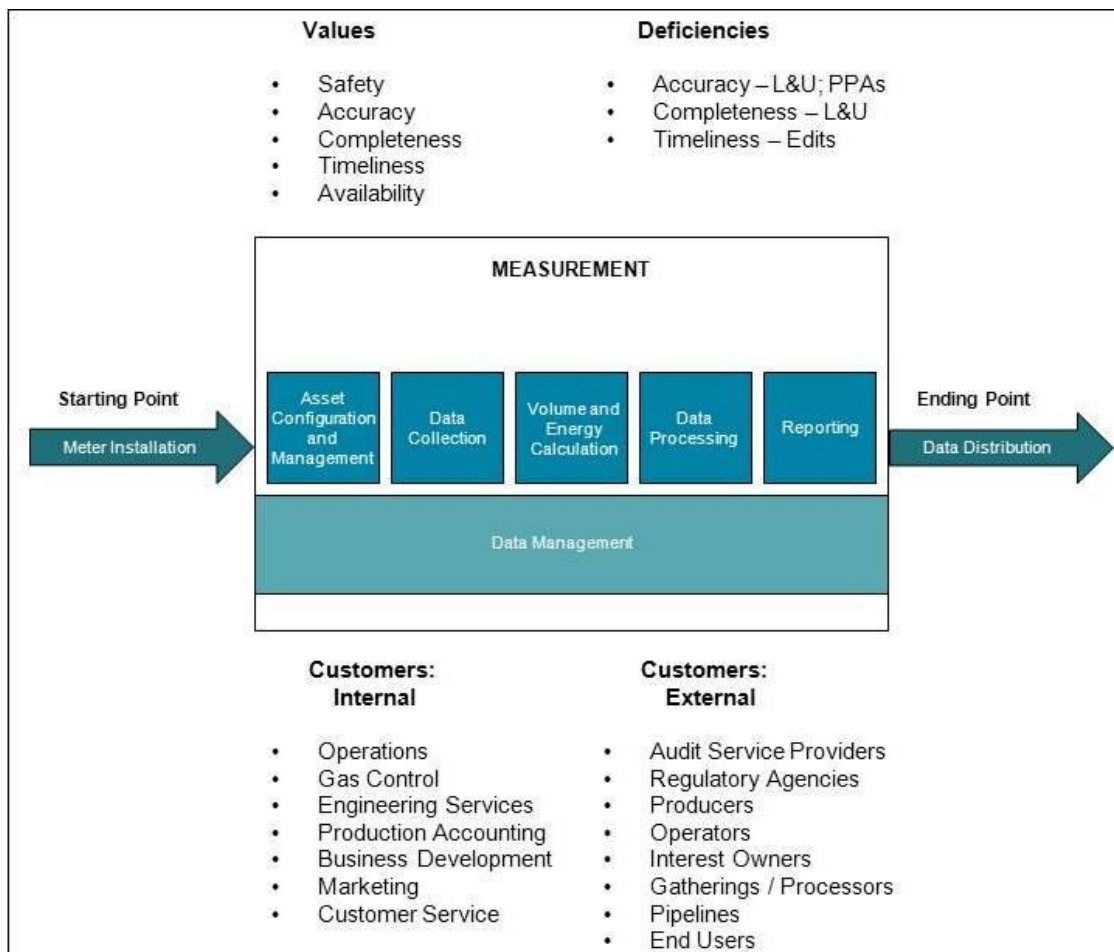
A *process* can be thought of as a *set of activities* that produce a product or service. The resulting product or service is intended to have more value than the process inputs.

As an example:

The measurement process adds value to a flowing gas stream by describing the gas quantity and quality. Without measurement, it is not known what is flowing or if anything is flowing at all.

Measurement process activities include:

- Asset configuration and management – Life cycle management of measurement assets from design, installation, and commissioning, to maintenance, and finally to inactivation and removal
- Data collection – Retrieval of asset data throughout the life cycle; including geographic, configuration, and quantity data
- Volume and energy calculations – All calculations and any re-calculations affecting quantity and quality
- Data processing – Entry and any subsequent manipulation of data in a computer
- Reporting – Generation and distribution of reports and files to customers
- Data management – Administrative process by which the 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



Measurement Process Decomposition

*Policies and procedures govern each process activity.* When policies and procedures are well suited and applied correctly, each activity should add value within the process (i.e., safety, accuracy, completeness, timeliness, and availability).

### **CONSEQUENCES OF POLICY AND PROCEDURE DEFICIENCIES**

Unsatisfactory policies and procedures create gaps in process value delivery. Implications include lost revenue, legal liability, scrap and rework, and customer dissatisfaction.

#### **Example 1:**

**Process activity: Asset configuration and management**

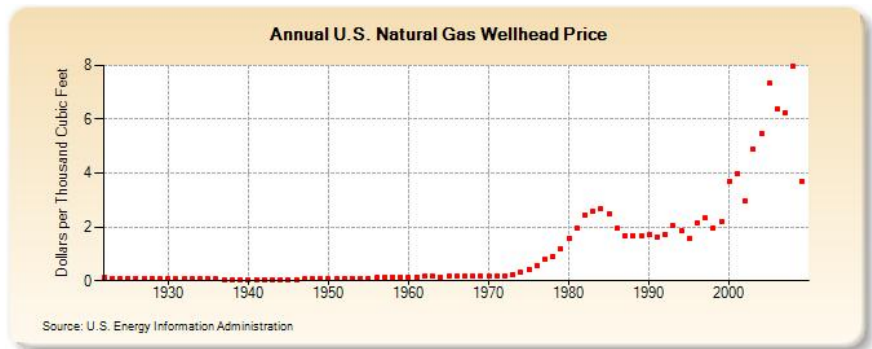
**Process value: Accuracy**

**Policy: Chart recorders vs. flow computers**

Asset configuration and management includes meter system installation and configuration. Metering systems are installed to obtain accurate flow data for operational and commercial activities. Common metering systems use orifice devices with chart recorders or flow computers for volume recording.

Historically, chart recorder purchase costs were significantly less than flow computers. Relatively low and stable natural gas prices through the 1990's<sup>2</sup> held back flow computer installation and chart recorder replacement, except for at very high flow rate stations.

Increasing gas prices and volatility, from 1999 through today, are causing companies to rethink the limits for reasonable measurement accuracy. Risk associated with gas measurement losses has increased, making flow computer performance a necessity for even small volume locations. However, old policies remain.



The following example considers how an antiquated asset configuration and management policy can negatively impact an organization's bottom line and become misaligned with organizational mission, vision, and values.

### Flow Computer Installation Policy Example:

Meter volume quantification impacts custody transfer and wellhead allocation applications. Accuracy and repeatability are important in both cases. If a policy allows flow computers to replace chart recorders on orifice meters, but uses capital cost and the chart recorder's reported daily flow rate as the only criteria for making the choice, the policy may need revision.

For instance, assume a policy will only allow flow computers on meters flowing 100 mcf/d or greater. If a meter in a volatile flow environment records 50 mcf/d using a chart recorder, but the same meter records only 25 mcf/d using a flow computer, the difference could equate to over \$35,000 dollars per year. This policy may have been fine in years past, but increased gas prices and price volatility now make increased accuracy a value that is both affordable and necessary. Therefore, this policy should be reviewed and revised.

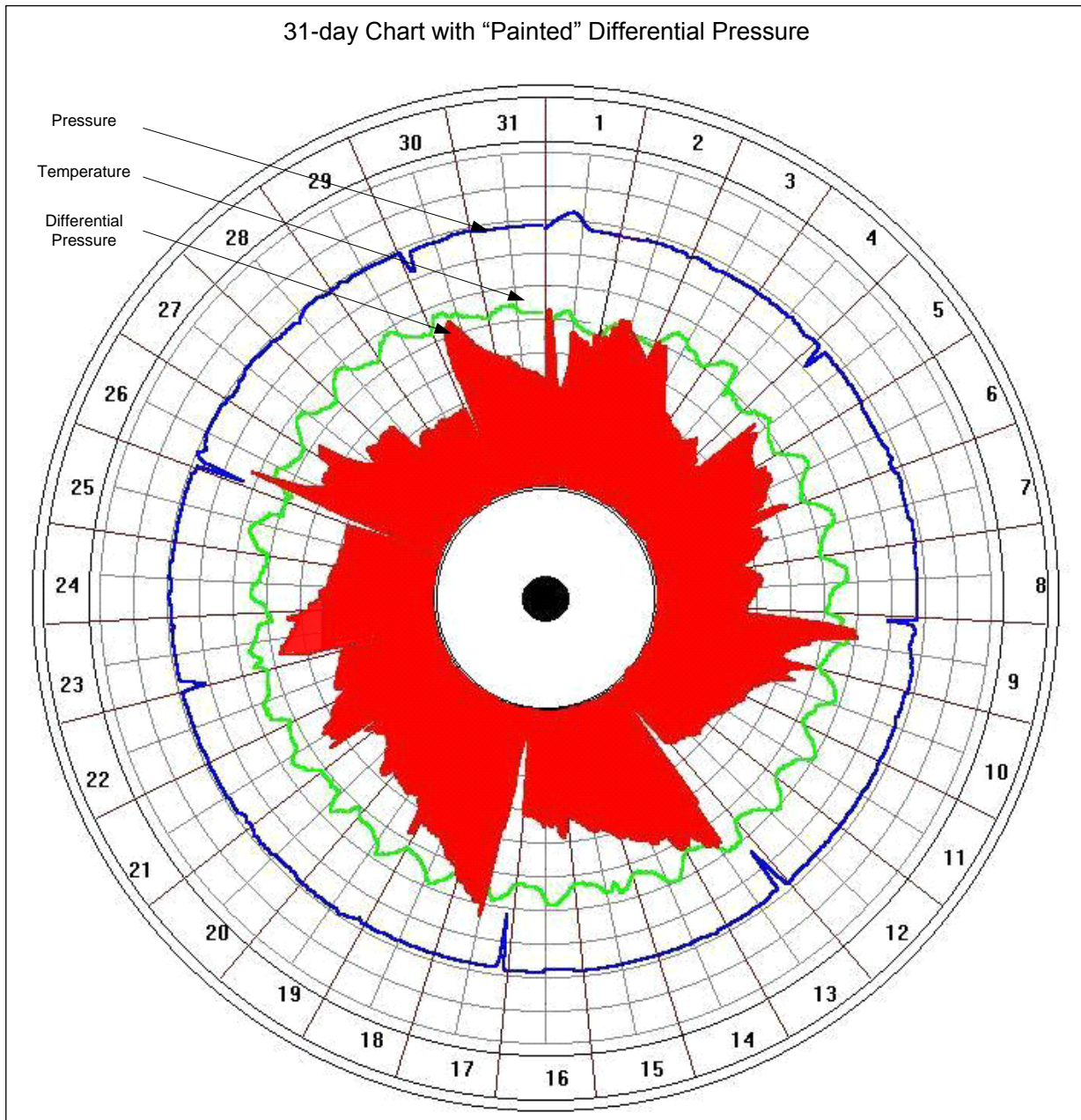
**Note:** Btu/scf and price per mmBtu are assumed at 1000 and \$4, respectively.

### Charts vs. Flow Computers

At times, flow volatility for wellhead orifice meters exceeds the limits of a chart recorder's ability to respond to and record flow changes. This is especially a problem when the differential pressure is "painted" as a solid band on the chart. When integrating the chart, differential pressure is interpreted as a continuous line representing some percentage of the band width. In this case, the potential for error is great. The problem is compounded when the differential pressure registers zero at the low end of the band. There is no way to determine the actual amount of flowing time, so the chart is integrated as if flow was continuous. Problems are reduced by using flow computers with flow variable sampling rates of 1 second or better.

<sup>2</sup> Annual U.S. Natural Gas Wellhead Price. March 12 2010. <<http://tonto.eia.doe.gov/dnav/ng/hist/n9190us3a.htm>>.

The depiction below illustrates a chart recorder used beyond its performance limits



**Example 2:**

**Process activity:** Data processing and reporting

**Process value:** Availability and timeliness

**Policy:** System balancing using best available data

Having a complete set of best available data in a timely manner for use by stakeholders is important. Policies, procedures, and the right tools can help provide measurement data in near real-time frequencies.

## Balancing Policy Example:

A gathering company has a small wellhead gathering system. The system measures volumes from 10 wells at the wellhead and at a central point downstream. The total daily volume of all the wells is 5,000 mcf. Individual well flow rates range from 50 mcf to 1,500 mcf. Five of the wells produce less than 100 mcf and use orifice meters with chart recorders. Some charts are 8-day, while others are 31-day. The remaining wells measure volumes with orifice meters and flow computers and have telemetry. The meters that have flow computers provide data daily to the company's central measurement system. Charts are integrated, and the results imported into the central measurement system at various times of the month.

The central measurement system has volume and energy balancing capabilities. Balancing resolution can be hourly, daily, or monthly. However, because some volumes are not received but once per month, the measurement policy and practice is to only run balance reports at month's end after all volumes are received. Analysts review the balances at that time, looking for potential problems. Often, by the time problems are found, the production period has been finalized and any corrections generate re-work in the form of prior period adjustments (PPAs). PPAs negatively impact the workload of multiple departments and cost hundreds of dollars per adjustment in labor. Furthermore, PPAs can be a significant cause of customer dissatisfaction.

Although not used, the central measurement system can provide statistically derived volumes when actual metered volumes have not yet been made available. The estimated data is replaced when actual data is entered into the measurement system.

The company's balancing policies and procedures generally result in good balancing reports, until problems with field measurement occur.

Suppose on the fifth day of the month, one of the larger wellhead meters (1,500 mcf) had orifice plate damage causing 10% under measurement. The 150 mcf error might not be significant enough to be noticed at the central measurement meter and would not be caught with a balancing report until month-end. The 25-day under-measured amount would be 3,750 mcf which has a dollar equivalent of nearly \$15,000 (assuming \$4 per mcf).

The problem could have been caught on the sixth day of the production month if the measurement policy required the use of the central measurement system's automated volume estimation along with daily balance review.

## MEASURING POLICY AND PROCEDURE EFFECTIVENESS

Process performance is an indicator of policy and procedure effectiveness. Performance can be determined using key performance indicators (KPIs) which measure process value deficiencies.

Measurement Process Values	Key Performance Indicators	Limit	Relative Level of Difficulty	Frequency
Safety	Reportable events, incident rates, etc.	?	Low	Hi
Accuracy	L&U, PPAs, edits	?	Low	Hi
Timeliness	L&U, PPAs, edits	?	Low	Hi
Availability	PPAs, edits	?	Low	Hi
Customer Satisfaction	Survey	?	High	?

## COMMON REASONS FOR POLICY AND PROCEDURE FAILURE

There can be many different reasons that failure occurs within outlined policies and procedures. A few of the common reasons include policies and procedures being:

- Poorly designed or incomplete – Policies should be consistent with the organization's mission, culture, strategy, and vision.
  - There should be no overlap or contradiction with other policies. Policies should be clear, easily understood, realistic, and capable of being implemented. Stakeholder input should be given appropriate consideration.
  - Procedures should have, at a minimum, these components

- Purpose
- Actions
- Sequence
- Who completes each step
- Where
- When
- Standards
- Outdated – Policies and procedures should be reviewed periodically and updated when issues exist. Some issues that may require policies and procedures to be updated include:
  - Legislation or regulation changes
  - Legal protection
  - Fair and consistent treatment
  - Confusion about required action
  - Inconsistency in actions or activities
  - Accidents
  - Customer complaints
  - Inefficiencies
- Ineffectively communicated – All the effort goes into creating policies and procedures, but not enough effort goes into communicating and training for policy and procedure changes.

### **WHO IS RESPONSIBLE FOR WRITING POLICIES AND PROCEDURES?**

To produce measurement practices documents that are consistent, updateable, and meaningful, careful consideration is required.

The manager over the measurement group is responsible for measurement policies and procedures. The manager may be the person who writes the practices or may oversee a working group responsible for the development and writing of practices. Either way, there must be a plan for future review and modification responsibilities.

### **EFFECTIVE COMMUNICATION**

The best measurement practices are only as good as their implementation. No benefit will result if the users of the policies and procedures are unaware, unappreciative, or do not understand their practical application.

Some suggestions to remember when communicating measurement practices are:

- Know who the stakeholders are
- Keep them informed as practice changes are being developed or modified
- Solicit and make use of feedback
- Provide the users with training, when needed
- Include a review and sign-off of all measurement practices during orientation for new measurement personnel

Also, do not forget that your customers, both internal and external, are stakeholders and will need to be aware of certain measurement policies and procedures.

### **CONCLUSION**

In a competitive market place, effective organizations understand where they are, where they want to be, and how to get there. They have made the effort to understand and continuously improve business processes which includes creating and maintaining policies and procedures that support the organization's mission, vision, and core values. Choosing to neglect policy and procedure maintenance will always increase risk for the organization.