

## **TRAINING OFFICE MEASUREMENT PERSONNEL**

Perry Dee Hummel

Atlas Pipeline Mid-Continent LLC  
1437 South Boulder  
Suite 1500  
Tulsa, Oklahoma 741119

### Introduction

Experience is the best teacher. We've all heard that saying, but, what if there aren't any experienced personnel left to hire?

After years of downsizing, mergers, and attrition, the industry finds itself in a shortage of good trained personnel. The only way to overcome this problem is to provide the new employee with comprehensive training. Successful training is paramount to the success of the gas measurement department and your company.

### Overview

Technology has "raised the bar" for the trainer and the trainee. While the industry evolved in the EFM and data technology fields, the basic fundamentals still remain an important part of gas measurement training.

However, new computer based measurement systems also require additional skills. While the measurement system is designed to reduce the workload and identify potential errors, the trainee must still understand the basics.

### Trainee Skills and Requirements

Each individual learns at a different rate, and through different motivational techniques. Before the trainee is selected, it is best to screen the applicant for basic computer skills, temperament, and any prior measurement experience. You want to be able to concentrate training hours on gas measurement, or your measurement software system.

Traits and skills for the potential trainee should include:

- Good computer skills
- Good hand-eye coordination
- Good work ethic
- Good Analytical skills
- Good Math skills
- Good attitude
- People oriented
- Service oriented
- Able to handle stress in a deadline oriented environment

### Trainer's Skills and Requirements

The trainer must be able to express ideas, concepts, and the measurement process proficiently.

Experience is a must for the trainer.

Some of the trainer's skills should include:

- Excellent communicator
- Flexible presentation manner
- Thorough knowledge of gas measurement
- Excellent analytical skills
- Organizational skills
- Ability to define realistic training goals
- Ability to keep the training timely, simple, and focused

### The Training Outline

Before the trainee begins their job in a chart department or as an EFM analyst, start with the basics. Explain where gas comes from, and how it is produced. Depending on their background, the trainee, may have never visited a meter site, or been exposed to any production facilities.

Think of training from their perspective; what general topics are needed to begin the fundamental training? What are the minimum skills that a trainee will need to start their job? What tools will the trainee need?

A general outline should include:

- Explanation of gas measurement. Why is it important? Explain how this process impacts the commercial and operational groups.
- Natural gas fundamentals; what is natural gas? Where does it come from?
- Measurement terms and definitions; what terms are commonly used in day to day business?
- Define the types of gas measurement devices.
- Gas Quality; why is it important?
- Chart training
- EFM training
- System balances; why is a balance important?

- Auditing; internal and external.
- Measurement process and work flow in the department.
- AGA standards.
- Measurement Process and Procedures Manual

- Energy standards; Btu/Cf, MMBtu.
- Volume calculation methods

### Fundamentals

The purpose of training is to make the trainee proficient in aspects of the measurement department. A good beginning is an understanding of what natural gas is, and how it is produced. Don't ever assume anything; always keep it simple, but, be able to get the concept across. Remember, don't overwhelm the trainee.

Use visual aids to re-enforce your training. Use examples; make the examples tie to measurement concepts. For example, you can explain how a producer uses an "intermitter" for a production method. Then show how that production technique is represented on a chart or an EFM.

Try to start with the basics; show the trainees why measurement is important, from filing, to billing, to auditing. A workflow diagram is helpful to show how the measurement data flows throughout a company. Explain the various tasks and duties that are involved in the measurement process. Always let the trainee know, that no job is too small, or unimportant in the measurement process. Always emphasize the impact of measurement to the commercial and operational well being of the company.

Emphasize the importance of consistency; point out various parts of the process that are repetitive. Focus on a consistent monthly close process. Emphasize the importance of following the measurement procedures and documentation of the close process.

### Measurement Definitions

A good start for the trainee is to understand measurement terms and definitions that are used in the industry. A glossary of terms should be included in the desk top procedures manual. This will be a resource for the trainee to use after the formal training has concluded.

The terms and definitions should include explanations for both the measurement process, and measuring devices. You must start with the basic terms, so, the trainee can build both knowledge and confidence in their position.

Some good examples of terms and definitions would include:

- Pressure base
- Atmospheric base
- Temperature base
- Volumetric standards; Cubic foot, MCF, BCF.

### Measurement Devices

Once the trainee has a good understanding of measurement terms, you can introduce the various types of measuring devices. For example, if the trainee will be editing EFM orifice meters, then, begin the training on orifice metering. You can reinforce terms and definitions, while you explain how the primary element works.

After the trainee understands the primary element, you can introduce the secondary and tertiary elements. Then introduce and explain both the chart and EFM process.

If your company has a chart processing department, demonstrate the integration process. Show the trainee how the chart flows through the integration process, from censoring to volume statement. If the trainee will be working in the chart group, assign the trainee to a full time employee for some "one on one" training.

If the trainee will be in the EFM editing group, take the same approach. Begin by showing the trainee the Scada acquisition system, or the manual meter import process. Also, show how the EFM data flows through the department to the downstream users. Teaming the trainee with an experienced analyst will provide immediate benefits.

Next, introduce positive displacement metering. Use examples of diaphragm, rotary, and turbine meters to exemplify the differences. Discuss, and reinforce the differences in the volume calculations, and various applications for PD meters.

### Gas Quality

Most trainees may not fully understand the importance of gas quality. A careful explanation how gas quality affects both the volume and energy computation is important.

Explain the various hydrocarbon components found in natural gas. A brief explanation of chromatography might help the trainee understand how the gas quality is quantified. Avoid going into too much detail, but concentrate on the "concept" of gas quality. Use examples to show the differences in lean and rich gas. Be sure to explain how gas gravity affects the volume calculation. It's not important for the trainee to understand how chromatography works, but, rather how the results are applied to the volumetric and energy computations.

Emphasize the “terms” for dry and saturated BTU factors. This will help tie some the fundamental concepts to the process, and also link the concept to contractual requirements.

### Chart Training

Always start at the beginning; the same is true with chart processing. If possible, arrange a field trip to show the trainee how charts are prepared and changed in the field. There is no better way for the trainee to understand the chart changing process, except by experiencing it first hand.

If a field trip is not possible, explain the process, and assign the trainee to the chart censoring group. This will require some training on how to recognize on-off dates, meter ranges, clock rotations, and “notes” drawn on the charts.

Also include other tasks, such as filing, reporting, and chart tracking. During each step, emphasize the importance of each task, and that each task is interdependent.

As the trainee progresses, the integration process may be introduced. Keep it simple, start the trainee on less complicated chart patterns. Let the trainee build skills and confidence by integrating less complex patterns. Once they have mastered the process, speed and complexity will increase.

The next step is volume computation and review. Prior to close, gas volume statements are printed for review and verification of accuracy. From the chart censoring training, the trainee will be able review the gas volume statement for meter ranges, orifice and meter tube sizes, and gas quality data. It is important to stress the importance of the “chart master” in the chart processing system. This comparison, along with meter test reports will affirm that the volume is computed correctly.

### EFM Training

An employee who has worked in the chart department is a very good candidate for an analyst position. Chart processing experience is helpful in training an EFM analyst. However, if the trainee does not have any prior experience, begin by presenting the measurement department’s workflow diagram. Review the data flow from the field to the office.

If possible, arrange a field trip to an EFM site. This will help the trainee visualize the installation, and how the data is stored and collected. If your company has a Scada group, arrange a tour of that department. This will help the trainee become familiar with the Scada technicians and create contacts within the group.

Provide “hands on” training for the various software packages that the trainee will have to use in their daily routine. A desktop manual for the various software packages is helpful. Initially, let the trainee observe how the process works.

Start the editing work gradually, under the direct supervision of a lead analyst. Be available anytime to observe and review the work done by the trainee. Always provide feedback during the training process.

### System Balances

An important part of the training is the inclusion of system balances. A system balance can help to hone analytical and trouble shooting skills. Again, start with small systems, and work into more complex systems. Investigating system imbalances will provide interaction with various business groups. As a benchmark, track the imbalances as they are resolved.

### Auditing

A natural progression in the measurement group includes the auditing function. Skills learned from the chart, EFM, and “balancing” positions are used in the auditing position. Communications skills, both written and verbal are important prerequisites for this position. As a trainer, it is your responsibility to demonstrate these techniques to the trainee.

### AGA standards

Trainers should provide guidance on the various AGA standards that are used in gas measurement. A central library should be available for the trainee to read and review the standards.

Use specific examples to show the applicability of the standards to daily workflow. This will assist the trainee in becoming familiar with the standards.

### Organizational Memberships

Encourage the trainee to join local or regional measurement organizations. These affiliations are helpful in the training process. Not only is formal training available from these organizations, but, networking is also a benefit.

### Conclusion

Training measurement personnel in today’s industry is a challenging opportunity. Technology, and skill levels have changed over the years. A careful and well planned training program can yield many benefits. But always keep in mind, training is only the beginning of experience.