

# TRAINING OF OFFICE MEASUREMENT PERSONNEL

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## INTRODUCTION

It has long been held that the measurement function is the “cash register” for the energy industry. Other facts that relate to measurement are that it involves the application of scientific laws, knowledge of physical properties, application of mathematics, and facilitated in an environment based on industry standards and company policies and procedures. Also, ask someone who is not employed in the energy industry what that person knows about energy measurement. Chances are that he or she will know very little. So, the energy measurement function, while a “cash register” for the industry and based on science, is also a unique activity that requires specific knowledge, skills and experience. What types of unique qualifications are needed will be identified and some methods for providing training for measurement personnel will be discussed.

The “cash register” reference also implies a financial implication to the organization, whether it is an internal measurement function of an energy company, or a service provider that performs the measurement function as an outsourced service offering to energy organizations. This financial implication will require that proper accounting controls be present and that all procedures are auditable, all reported volumes are reproducible from the sources of raw data, and that documentation is kept that has accompanied the data through the process of being converted from raw data to reportable numbers. Those who perform these processes must understand the importance of the financial implication and the potential impact of measurement uncertainty to their customers.

## MEASUREMENT OFFICE ACTIVITIES

A small percentage of the activity in the measurement office is somewhat routine and clerical in nature. However, the remainder is unique to the measurement function and can be considered a trade, or even an art, such as running a chart integrator. Since the final product, a volume statement, contains information that will be tied to the financial function of the organization, and the technology utilized to record and calculate the numbers provided on the volume statement is based on the science and technology of measurement, some activities unique to the measurement office organization will be performed that require some specific technical knowledge.

The data are typically received in a raw form, such as recorded on a paper chart, or electronically, such as EFM or gas analysis data. The raw data must be screened for validity, missing or erroneous data, etc. Data must be entered, either via manual data entry, or electronic import, into a measurement system. If the data are received in the form of paper charts, they must be censored, integrated, and the data passed on to the measurement system. If the data are electronic, they must be in the correct format for import into the measurement system. Meter stations must be correctly set up in the measurement system prior to any data import and measurement changes, such as orifice size changes, etc., must be entered to ensure data is handled correctly and the results will match reality.

Practically all measurement office activities are driven forward by a monthly business cycle. The raw data are collected throughout the calendar month, and then final volume statements are delivered by a deadline in the following month. Efficient processes must be in place to receive the data and put the processes in motion to meet the closing deadlines. Along the way, various activities will take place to provide validation. These activities require various amounts of skill, specific knowledge and experience. Some require the basic knowledge of the environment of the recording device, such as the ability to visually inspect the chart, marking with a pencil, things that will help guide the chart integration and identify anomalies that need the integrator’s attention. EFM data must typically be imported into the measurement system. There are typically tools built into the import process that flag anomalies such as missing data, out-of-range values, unrecognizable digital characters, etc. Someone familiar with how to handle these flags is required to perform or monitor the import function.

Gas analysis information is typically applied in the measurement system to the volume data and recalculations are performed per some effective date. Personnel who are familiar with valid gas analysis data ranges and the proper effective dates are required to perform and monitor this function. Actions by the field personnel that could potentially change the volume value outcome, such as recording instrument range changes or calibrations, will trigger a notification to the measurement office to apply the changes to the data based on an effective date. Field personnel may provide information to the measurement office to “alibi” problems with the data, such as when a chart clock stops, an EFM battery experiences low voltage, the recording gauge

lines freeze or experience leaks, and other problem situations that require manual intervention of the data in the measurement office. These all require some familiarization in the measurement office with the proper procedures to maintain audit trail requirements.

## TRAINING REQUIREMENTS

As mentioned earlier, a small percentage of the activity in the measurement office is considered routine and clerical. That means there is a large percentage that is considered specialized or requiring a higher level of skills. To meet the requirements of the financial implication of the measurement work taking place, there will need to be employees that know exactly what they are doing. There will need to be supervisory employees that take accountability for the office's output and for keeping the workload flowing through the office, meeting the deadline needs of the internal and external customers.

Measurement office work, whether integrating charts, manipulating volumetric and gas quality data, querying databases for validation and troubleshooting purposes, due to the skill requirements, is not something a novice can step immediately into. It is not as simple as handing a new employee a manual or instruction sheet. There must be experienced mentors available for new employees to have the measurement trade passed on to them by and hopefully develop the art in those that have the aptitude for it. The mentors, based on the financial reporting requirements of the organization, must reinforce the measurement accuracy and uncertainty requirements for the data. It must be ingrained with the trainee the importance of meeting closing deadlines and the downstream commercial costs associated with having to make adjustments to prior periods.

## TRAINING METHODS

One of the most tried and true forms of training that has been around for centuries is through apprenticeship. The Webster's Dictionary definition is: *apprentice 1.a: one bound by indenture to serve another for a prescribed period with a view to learning an art or trade b: one who is learning by practical experience under skilled workers a trade, art or calling.* Another Webster's definition is: *art 1: skill acquired by experience, study, or observation.* Still another applicable definition from Webster's is: *trade 3.a: the business or work in which one engages regularly b: an occupation requiring manual or mechanical skill.* The ideal situation for training entry-level measurement office employees is to set up an apprenticeship-like system whereby seasoned employees that are considered experts in the various parts of the process can work along side the new employee. The expertise of the trainer can be passed along to the beginner in digestible portions, without the pressure of being totally being accountable for the volume statement accuracy. With organizational changes that have evolved over the last 20 years as a result of deregulation, the apprentice approach has almost

disappeared. Downsized organizations have shed many older, experienced workers and allowed untold number of years of experience to walk out the door. Younger workers that have been hired in recent years are typically placed directly into vacancies without the opportunity to develop skills and experience over a longer time.

The more routine activities of the measurement office, such as organizing charts and statements, looking over data for obvious anomalies, filing, etc., are more easily passed on to new employees with a minimum of training involved. Manuals, including step-by-step instructions, screen-prints, examples, etc. are very effective training tools and are actually a collection of the knowledge and experience gaining by others, placed in a binder that can be accessed by lesser-experienced employees. The methodical ramping up of responsibilities, along with the encouragement in the trainee building his or her own instruction manuals, is a confidence-building approach to helping make a seasoned, productive employee that can develop the skills needed in the measurement trade, and potentially become proficient in one or more activities of the process.

When a beginning employee has been given a digestible portion of the process to take over and given continuous feedback on performance, the confidence builds and a knowledge base builds. Once the supervisor is confident that a person is ready to take on additional challenges, it may be the right time to turn over more duties that require additional responsibilities. The goal is for that employee to learn the process from one end to the other. Then, at the point that the employee is familiar and has developed the skills to handle the entire process, a single client, project, or other dividable portion may be handed off to that employee. The supervisor may review the final work product, which is usually the volume statement, for a period of time to provide final QA/QC, along with immediate feedback to the employee to point out the good and the needs for improvement, to polish the employee's knowledge and skills.

Once employees have been exposed to the basic fundamentals of measurement office activities, they should be somehow exposed to field measurement activities, which is the source of their raw data that is the starting point of their process. Whether this exposure to field measurement is through field trips whereby they ride around with field measurement personnel, or where field measurement personnel come into the office to share their trade with the office personnel, it is most valuable to see another perspective. Also, any exposure to the fundamentals of measurement that can be provided, which is the same type of fundamentals that the field measurement personnel are taught early on, is very valuable and will be worth the time and investment to provide.

In addition to consideration of the specific training methods, management and supervisory personnel should continuously be considering succession planning

and the training that goes along with it. Positions of increasing responsibility in the measurement office processes should have someone identified to be preparing for those roles and learning the additional duties and developing the knowledge, skills and experience that will be required. The normal attrition for employees in critical roles or the possibility that something unforeseen may happen put a high level of importance to identifying successors and making sure that a sudden vacancy will not put the processes in a situation of high risk of failure.

### **TRAINING RESULTS**

The results of proper and adequate training of measurement office personnel will include the ability to meet aggressive closing schedules routinely and with few prior period adjustments necessary. The ability of a measurement organization to accomplish this feat is going to have a significant effect on the bottom line, whether the measurement office function is an in-house measurement department, or a third-party service provider. Employees who know what they are doing are more comfortable with their day-to-day duties and are happier and less stressed. Morale issues caused by stress and dependence on inexperienced or under-trained employees are a drain on the organization and lead to turnover. A churn of employees in a field such as gas measurement that takes time to develop the knowledge, skills and experience is a detrimental situation. As mentioned earlier, measurement is not a well-known discipline outside of the energy industry and

it is not easy to bring someone in “off of the street” that can step right in and contribute without some intensive orientation and fundamentals training up front.

Well-trained employees are required for measurement office operations when those operations are driven by closing deadlines, especially when the receipt schedule of most of the raw measurement data is out of their control. The processes must run efficiently and be able to self-correct for situations such as late-delivered charts, or system malfunctions, etc. Trained employees can adapt to adverse situations, when required, where untrained employees may not be able to function.

### **CONCLUSION**

Entry-level positions in most measurement organizations that are truly “trainee” positions are almost a thing of the past. Positions are typically filled based on potential to learn, so basic on-the-job training programs must be in place. There is nothing more valuable in measurement offices than highly seasoned, highly skilled employees that can pass their knowledge, skills and experience on to new employees. At the same time they are providing this mentoring role, they are also ensuring that the final product, volume statements, are meeting the stringent quality control requirements and meeting the aggressive deadlines typically imposed.

### **REFERENCES**

Webster’s Ninth New Collegiate Dictionary



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