TRAINING FIELD MEASUREMENT PERSONNEL

Overview of a Comprehensive Curriculum and Program

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INTRODUCTION

The knowledge base expectation that exists today for the measurement technician is extremely demanding. From the latest in electronic controls to pneumatic controls…from communication system support to dual-disciplined or even tri-disciplined technicians…from the measurement equipment they support to the procedures that must be followed…from the regulatory requirements governing the facilities to the training of field personnel… all create a tremendous and ongoing challenge to meet these demands.

PAST to PRESENT

Years ago, every major company staffed its own measurement training facility that typically included videos, classroom training sessions, and hands-on field training. The Standard Operating Procedures (SOP) were taught and understood by all measurement technicians. Every measurement technician was cycled through multi-level training classes, receiving certificates and sign-off upon completion of each measurement level attained.

By the mid- to late 90s, deregulation and major corporate organizational changes resulted in the majority of company-staffed measurement training facilities being discontinued. Many companies went through major SOP consolidation and re-write modifications. Fortunately, the training invested to that point sustained a positive result for a period of time.

Today, however, new measurement technicians being hired do not have the benefit of the training and knowledge their predecessors received. The computer skills and operations knowledge required by the never-ending list of new equipment has raised the bar of expectations higher than ever before. In addition, the Operator Qualification program has made a significant impact on required documentation and sign-off for new and existing measurement personnel.

TRAINING REQUIREMENTS

Today, new measurement technicians typically enter the field with electronic and/or instrumentation background. Computers are second nature to them, and they are ready to embrace the latest technology gas measurement has to offer. However, the out-of-date SOPs, combined with the lack of basic theory behind the fundamentals of gas measurement, make it difficult for the new measurement technician to see and understand the big picture well enough to effectively move forward.

Additionally, the Operator Qualification program should be clearly understood to ensure that your training program and documentation meet the Department of Transportation (DOT) and the Process Safety Management (PSM) requirements.

CURRENT CHALLENGES

The number one challenge facing every new measurement technician today (as well as his/her supervisor) is finding the time to devote to training. The second major challenge is developing the recommended training curriculum that adequately meets your company's needs. The first step is to identify both the existing training opportunities and the training deficiencies in your organization.

For example: should the training be focused on your individual company's SOP, or should it employ a more general approach to the theory behind the fundamentals of gas measurement? Also, how much time should be spent in the classroom versus hands-on field experience training? Finally, the most effective training classes regarding EFM hardware, chromatographs, valves and other devices can best be provided by the individual manufacturers themselves.

KEY TRAINING TOPICS

These are the key areas of training that should be included in order to provide a comprehensive training curriculum for field measurement personnel.

Fundamentals of Gas Measurement – Covering the fundamental gas laws, basic math, Boyle's Law, Charles Law, deviation from Boyle's Law, and the typical standard units of measurement

Basic Electronics

Volume Calculation to Energy Measurement

Orifice Metering and AGA 3

Turbine Meters and AGA7

Positive Displacement Meters and AGA 7

Ultrasonic Meters and AGA 9 and AGA 10

Coriolis Meters and AGA 11

AGA 8 - Compressibility Factors of Natural Gas

API 21.1 – Electronic Gas Measurement

Overall Measurement Accuracy

Gas Sampling

Chromatograph

Specific Gravity Determination

Determination of Moisture Content

Automatic Control of Flow and Pressure

Control Valve and Regulator Equipment

Odorization

Electronic Flow Computer

Supervisory Control and Data Acquisition (SCADA)

Corrosion Control and Cathodic Protection in Pipeline Operations

Communication Techniques

TRAINING SOURCES

The following is a list of organizations known to offer measurement training. Please note that this list is not comprehensive, and that there are certainly more organizations offering such courses.

AFMS – Acadiana Flow Measurement Society (Lafayette)

AGA – American Gas Association (Various)

AGMSC – Appalachian Gas Measurement (Pittsburg)

ASGMT – American School of Gas Measurement Technology (Houston)

CCGMS – Corpus Christi Gas Measurement Society (Corpus Christi)

CEESI – Colorado Engineering Experimental Station Inc.

CGA – Canadian Gas Measurement School (Edmonton)

CSHM – Canadian School of Hydrocarbon Measurement (Calgary)

Entelec (Houston)

GCGMS – Gulf Coast Gas Measurement Society (Houston)

GCI – Gas Certification Institute, LLC (Houston)

SwRI – Southwest Research Institute (San Antonio)

ISHM – International School of Hydrocarbon Measurement (Oklahoma City)

PBIOS – Permian Basin International Oil Show

PETEX – Petroleum Extension Service UT (Various)

SGA – Southern Gas Association (Various)

TGA – Texas Gas Association (Dallas)

WGMSC – Western Gas Measurement Short Coarse (Seattle)

CONCLUSION

Measurement technology is changing, and it will continue to change at a rapid pace in the near future. To keep pace, every company would do well to invest the time to create a thorough training curriculum to meet their requirements. This curriculum must also be kept up to date with equipment changes, SOP changes, and organizational changes. The creation and implementation of such a curriculum is no longer an option, but a requirement. The impact that a measurement technician can have on customer relations, health and safety, and unaccounted-for gas loss is staggering to contemplate.

The training process will need to be ongoing; but your organization will reap the benefits for time spent wisely in this endeavor. This evolving area in our industry holds exciting possibilities for companies to grow through the implementation of comprehensive and documented training curriculums in the area of gas measurement.

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