



Natural Gas Quality Workshop

Sponsored by

SGA Transmission Technical Training Committee, SGA Transmission Measurement Interest Group Steering Committee, SGA Gas Quality Interest Group Steering Committee, and Southwest Research Institute



October 30 - 31, 2007
Southwest Research Institute
San Antonio, TX



Contact Pat Turman (pturman@southerngas.org) to be added to the distribution to receive this information when it is available.

Updated 08/02/07

NATURAL GAS QUALITY WORKSHOP

SCOPE

The Natural Gas Quality Workshop is a 2 day workshop that will focus on the need for accurate gas composition determination as well as the standards and methodology for the determination of accurate gas composition. The second half-day will feature both presentations by manufacturers as well as hands-on sampling exercises. Sessions include a mix of presentations, workshop activities, and group discussions.

WHO SHOULD ATTEND

- Those responsible for collecting and analyzing natural gas samples
- Those with measurement responsibilities

HOW TO REGISTER

You may register for this workshop by mail or fax using the registration form included. The registration fee of \$795 (\$995 non-member) includes all workshop materials, continental breakfast, and lunch. Registration is also available on line at www.southerngas.org; click on “Transmission Operations – Training” and then on this workshop.

HOTEL INFORMATION

The training takes place at Southwest Research Institute in San Antonio. Shuttle service to the training campus is provided each day. The shuttle will pick students up in the lobby of the Menger Hotel. The historic Menger Hotel is located at 204 Alamo Plaza in downtown San Antonio, next to the Alamo and one block from the Riverwalk.

You may make reservations at the Menger by calling (210) 223-4361 or (800) 345-9285 or pick from other downtown hotel options listed below:

Holiday Inn Express - Downtown (524 Saint Mary’s St., (210) 354-1333) (all suites with continental breakfast)
4-5 blocks from the Menger

Hampton Inn - Downtown (414 Bowie Street, (210) 225-8500) (continental breakfast)
3-4 blocks from the Menger

La Quinta Inn & Suites - Convention Center (303 Blum, (210) 222-9181) (continental breakfast)
4 blocks from the Menger

QUESTIONS?

Contact Pat Turman at (972) 620-4021 or pturman@southerngas.org

ABOUT THE FACILITIES

The course will be taught at the Metering Research Facility located at Southwest Research Institute in San Antonio, Texas. Constructed in 1991, the MRF was built to improve the state of the art of natural gas flow measurement by providing a specially-designed natural gas flow calibration facility capable of simulating field operating conditions. The research program at the MRF primarily focuses on flow meter accuracy, installation effects on metering accuracy, new meter development, energy measurement, metering automation, and data acquisition and analysis. Field installation problems, such as flow pulsation effects, gas composition effects, equipment failures, and gas processing problems can also be addressed at the MRF. Students will have the

opportunity to tour the MRF and see it in operation during the demonstration testing of commercially-available ultrasonic gas flow meters.

WORKSHOP FACILITATORS

Dr. Darin L. George is a mechanical and nuclear engineer with over fifteen years of experience in the measurement and control of liquid, gas and multiphase flows. Dr. George joined the Southwest Research Institute staff in 2000, with prior work experience at Sandia National Laboratories. Dr. George has been project manager of the gas quality and sampling research program since 2002. In this role, he has conducted studies of natural gas sampling methods, identified approaches for avoiding gas sample distortion, and identified best practices in the preparation of reference gas blends for gas chromatography. His research has been used as a basis for the 2006 edition of American Petroleum Institute MPMS Chapter 14.1, the U.S. standard for natural gas sampling practices. Dr. George is currently conducting research into the accurate prediction and measurement of hydrocarbon dew points, improved methods of determining natural gas quality, and issues regarding natural gas interchangeability. Dr. George has authored or co-authored over 30 publications on the topics of cavitation, multiphase flows and flow measurement methods, and is a registered Professional Engineer in South Carolina and Michigan.

Mr. Eric Kelner is a mechanical engineer with professional interests that include natural gas flow and quality measurement, and natural gas phase behavior and property determination. Other interests include statistical modeling of engineering system performance and engineering systems reliability. Before joining Southwest Research Institute in 1997, Mr. Kelner served as a measurement engineer for a natural gas pipeline company, and as a natural gas industry representative on several research steering committees. At SwRI, Mr. Kelner is the Leader of the Flow Measurement Group and has responsibility for the operation and maintenance of the MRF. At the MRF, he leads a team of scientists, engineers, and technicians in executing a comprehensive gas flow measurement research program funded primarily by GTI and PRCI. Technical information produced by this research program is used by gas industry standards writing groups around the world. He is a registered Professional Engineer in the state of Texas.

MANUFACTURER REPRESENTATIVES

Equipment manufacturers will also be invited to demonstrate specific equipment.

NATURAL GAS QUALITY WORKSHOP

Outline

Tuesday, October 30, 2007 (8 am to 5 pm)

I. Introduction

- a. The introduction will focus on the need for accurate gas composition determination. The impact of gas composition on gas properties will be emphasized:
 - Compressibility and density, used in volumetric flow rate calculations
 - Heating value, which affects the value of gas
 - Hydrocarbon and water vapor dew points
 - CO₂, H₂O, sulfur and other compounds that influence pipeline and equipment integrity
- b. Mechanisms of gas sample distortion, such as cold equipment, contaminated equipment, and the use of materials that are incompatible with natural gas will be discussed.

II. Natural Gas Mixtures

- a. An introduction to the components of natural gas, natural gas properties and quality measures:
 - hydrocarbon dew point,
 - water vapor dew point
 - density and compressibility
 - heating value
 - H₂S and total sulfur
 - CO₂, O₂, H₂O
 - condensable and inert components
- b. An introduction to the properties of production-grade, transmission-grade, hydrocarbon-saturated, water-saturated, and two-phase gas streams.

III. Natural Gas Composition Determination

- a. Natural Gas Sampling
 - i. Standards
 1. A review of pertinent standards, particularly API MPMS Chapter 14.1, GPA Standard 2166, GPA Standard 2172, GPA Standard 2145.
 - ii. Spot Sampling Methods
 - iii. Composite Sampling Methods and Equipment
 - iv. On-line Sampling
- b. Gas Chromatography
 - i. Theory
 - ii. Calibration Gas Standards
 - iii. Diagnostics
- c. On-line Analysis of Gas Quality
 - i. Water vapor
 - ii. Hydrocarbon and water vapor dew points
 - iii. Sulfur
 - iv. Energy determination
- d. Inferential Methods for Determining Natural Gas Properties

Wednesday, October 31, 2007 (8 am to 4 pm)

I. Manufacturer's Presentations

- a. Manufacturers will present a review of their sampling and analysis equipment. Potential participants include Welker Engineering, A-Plus Corporation, YZ Systems, Inc., Ametek, SpectraSensors, and Panametrics

II. Hands-On Equipment Demonstrations

- a. Stations will be established where students will practice taking spot samples, measuring dew points with a chilled-mirror device, and working with on-line gas quality analyzers.

III. Closing Remarks

Southern Gas Association/Southwest Research Institute

Course Registration Form
Natural Gas Quality Workshop

October 30 - 31, 2007

San Antonio, TX

(Please photocopy this form as necessary)

Name _____ Title _____
(Include nickname for badge)

Company _____

Address _____

City _____ State _____ ZIP _____

Telephone number _____ Fax number _____

E-mail Address _____

Brief job description _____

Length of time in company _____ Length of time in position _____

Check one: Registration fee of \$795 (\$995 non-member) –enclosed RMA

Please invoice

Credit Card

American Express

Master Card

Visa

Card # _____ Exp. _____

Signature: _____

Return to:

Debbie Krawzik

Southern Gas Association

3030 LBJ Freeway, Suite 1300 LB-60

Dallas, TX 75234

(972) 620-4021 Fax (972) 620-1613

Cancellation Policy: Refunds must be requested from SGA. For late cancellations, the following charge will be made:

- Canceling up to two weeks before the activity will be refunded in full*
- Canceling within two weeks of the program, 25 percent of fee*
- Canceling within three days, no refund but substitutions may be made*