

The background features a complex, stylized illustration of industrial piping, valves, and gauges in various shades of blue. The design is technical and detailed, with numerous circular gauges and interconnected pipes, creating a sense of a sophisticated industrial or laboratory environment.

# Sampling System Problem Solving and Maintenance Training (SSM)

Designed for Sampling System Technicians and Maintenance Personnel

**Sharpen Skills.  
Meet Demanding  
Requirements.  
Enroll Today.**

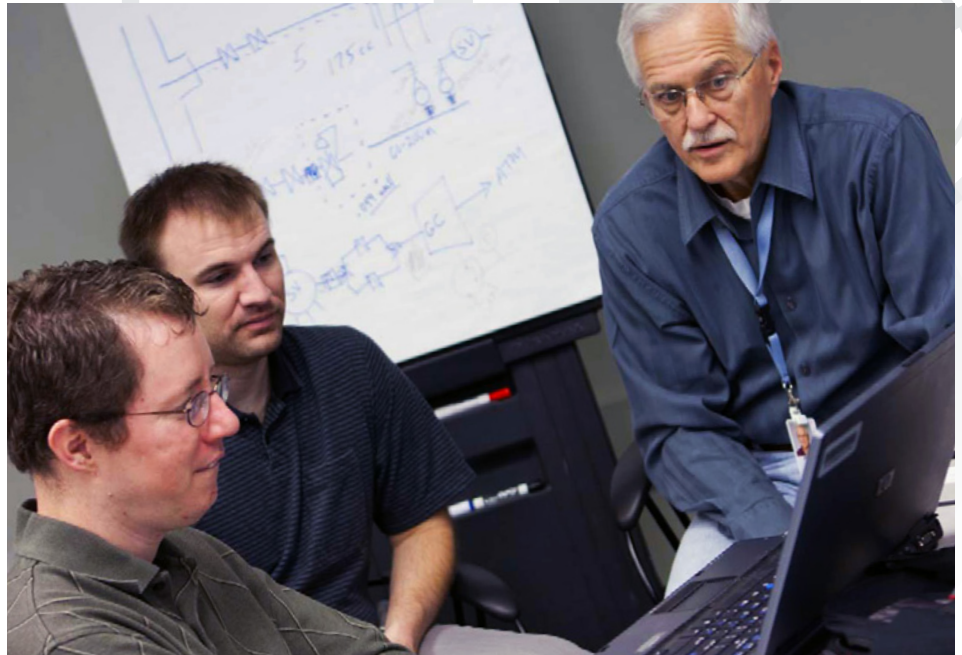
Swagelok®

# Troubleshoot Your Sampling System in Just Two Days

If your job is maintaining a sampling system, you may not have the time or resources to come up to speed on the system. Achieving the results you need depends on deepening your understanding of the system, as well as fine-tuning the system for optimum performance.

You can eliminate mistakes in your sampling system. And you don't have to do it alone. Swagelok Training prepares analytical instrumentation technicians and maintenance personnel to catch mistakes before they happen and recognize existing problems in installed sampling systems.

Our Sampling System Problem Solving and Maintenance Training (SSM) teaches fundamental and advanced practices in analytical instrumentation operation and maintenance, empowering you to maintain your sampling system with minimal error and greater system integrity.



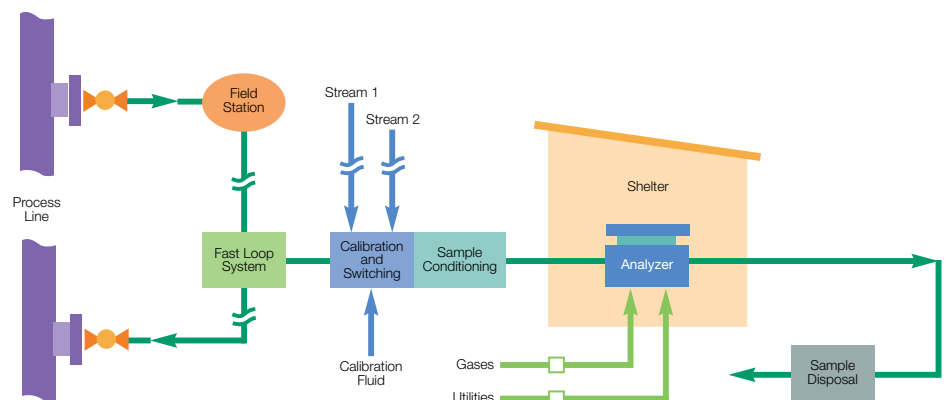
Students participate in an interactive exercise, learning to troubleshoot a sampling system.

## Course Objectives

Here are a few examples of what you will learn:

- Sample system performance
- Diagnosing and fixing time delay problems
- Sample conditioning techniques

[Learn more about SSM training at swagelok.com.](http://swagelok.com)



This two-day training course covers aspects of a sample system, from process line and tap through transport lines, steam switching, sample conditioning, analyzer and disposal.

## DAY 1

### Fundamentals: Classwork and Basic Exercises

- I. Performance of Sample Systems
  - Maintenance techniques
  - Sample compatibility with analyzer
  - Time delay in sampling
  - Mixing and contamination
- II. Diagnosing and Fixing Time Delay Problems
  - Sample transport time calculations for liquids and gases
  - Gas compressibility and time delay
- III. System Components
  - Flow valve basics and the effects of water hammer
  - Pressure measurement devices
  - In-depth look at pressure regulators and common problems
  - Pumps and temperature regulation

## DAY 2

### Sample Conditioning Techniques

- Proper use of filters and coalescers
- Understanding and controlling phase change
- Liquid, vapor, and gas separation devices
- Design of field stations and fast loops
- Troubleshooting sample systems
- Group projects

## Here's what graduates of this course have to say:

*"The broad scope of material covered helped me tie in many new concepts. I learned A LOT!"*

*"Good for helping me understand how the theoretical relates to real-life applications."*

*"The class lectures were helpful. Using real life experiences and situations made it very interesting."*

## About the Instructors

### **Dr. Stephen Jacobs**

*Owner and President of Jacobs Process Analytics, Inc.*



Dr. Stephen Jacobs, with over 25 years in the sampling systems industry, has designed, installed and maintained hundreds of analyzer and sampling systems for applications ranging from safety monitoring to closed-loop process control. Dr. Jacobs contributes the application of complex design principles and the configuration and adaptation of many sampling system components to solve difficult problems.

Dr. Jacobs received his PhD in Physical Chemistry from Wesleyan University.

### **Phil Harris**

*Industry Expert and Consultant*



In over 30 years of experience in industry and academia, Phil Harris has provided expert insight and analysis for a variety of applications. Mr. Harris is the author of many papers on analyzer systems and routinely presents at industry conferences and technical seminars.

With extensive experience in research, development and project management, Mr. Harris has supported many industries, including nuclear energy, oil refining, and alternative fuels. Mr. Harris earned both his Bachelor's and Master's degrees from the University of Manitoba.

### **Manny S. Alvarez**

*Engineer and Research Associate*



Manny Alvarez is an award-winning industry specialist who holds several patents in the analytical industry. Currently Education Chair of the ISA Analytical Division, Mr. Alvarez worked in engineering for The Exxon Corporation for nearly four decades prior to his retirement. Mr. Alvarez holds a Bachelor's degree in Physics and Mathematics from Rutgers University and a Master's degree in Chemistry from Princeton University.

**See the additional courses  
available at [swagelok.com](http://swagelok.com)**

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