Pilot Plant Design, Construction, and Operation

November 3–5, 2014
Houston, Texas

- Learn how properly defining a pilot plant program can save time and money
- Learn how to estimate costs accurately and quickly
- Understand the impact different types of space have on a unit’s design and operation
- Explore options for designing and constructing a pilot plant
- Learn how to select the right control system
- Understand the different types of instrumentation of special interest to pilot plant operations
- Discover how to optimize pilot plant start-up
- Learn how to minimize pilot plant maintenance costs and maximize its effectiveness

A course designed specifically for engineers, scientists, contractors, supervisors, and operators who build, design, operate, or support pilot plant and laboratory units.

“EVERY SECTION GAVE ME NEW IDEAS AND USEFUL INFORMATION.”—Pilot Plant Engineer

ENROLL ONLINE TODAY!
Examine Practical Concepts
This detailed course is designed for engineers, scientists, contractors, supervisors, and operators who build, design, operate, or support pilot plant and laboratory units. You will gain a comprehensive overview of all aspects involved in bringing a pilot plant to life, including:
- Defining the function of the pilot plant
- Cost factors
- Design
- Space requirements
- Control systems
- Safety and start-up
- Maintenance

Learn How To
- Identify the key issues and requirements for a new pilot plant
- Develop a comprehensive design basis
- Estimate the costs involved in pilot plants, including:
  - design and construction costs
  - start-up costs
  - operating costs
  - frequently overlooked cost factors
- Reduce pilot plant costs
- Estimate space requirements
The course will also explore the critical differences between pilot plant design and process plant design.

Course Text

Explore Critical Issues
This course provides information that you can put to work immediately, including how to:
- Examine different design approaches
- Determine control systems requirements
- Select and install the proper instrumentation, including:
  - gas and liquid flow sensors
  - liquid level sensors
  - temperature and pressure sensors
- Optimize your start-up efforts
- Determine appropriate start-up sequences for safe and efficient start-up
- Minimize maintenance costs, yet provide good maintenance

Attend and Benefit
Engineers and scientists who are involved in pilot plant design, development, and operation will learn the essentials and critically examine alternatives to traditional approaches. The course will be especially valuable to those involved in designing, building, and operating pilot plants in the following industries:
- Chemical, petrochemical, agrichemical, and specialty chemical
- Biotechnology, biochemical, and fermentation
- Pharmaceuticals and cosmetics
- Food processing
- Biofuels
- Refining
This course will be especially valuable to those who are:
- New to the pilot plant
- Designing pilot plants
- Managing pilot plants
- Operating pilot plants
The novice will be brought up to speed quickly and will benefit from the breadth and detail of the course. More experienced personnel will find the overall approach and breadth will help them better understand the complex interrelations between all of the different areas.

Your Instructor
Richard P. Palluzi is a Distinguished Engineering Associate at ExxonMobil Research and Engineering where he is responsible for the design, construction, and support of pilot plants and laboratories for ExxonMobil’s research site in Clinton, New Jersey. He also is a consultant on issues related to pilot plants throughout ExxonMobil worldwide. He has a bachelor of engineering degree and a master of engineering degree in chemical engineering from Stevens Institute of Technology. He is the author of two books, 30 articles, and 40 presentations on all phases of pilot plant and laboratory safety and operations. He is a past chair of the American Institute of Chemical Engineers’ (AIChE) Pilot Plant Committee and the Clinton site’s Safe Operations Team where he was responsible for reviewing and approving all pilot plant and laboratory installations and operations. He chaired ExxonMobil’s Pilot Plant and Laboratory Safety Standards Committee and was responsible for the development and dissemination of more than 100 internal company standards on pilot plant design and construction. He has consulted for the Department of Energy and the Department of Defense on research-related issues. Palluzi is a member of AIChE, the International Society of Automation, the American Society of Safety Engineers, and the National Fire Protection Association where he serves on the committees on NFPA-45 Fire Protection for Laboratories Using Chemicals and NFPA-55 Industrial and Medical Gases.
Important Course Topics

Welcome and Introduction
Elaine M. Bower, FAIChe
Program Director
Department of Engineering Professional Development
University of Wisconsin–Madison

Defining a Pilot Plant Program
- What is a pilot plant?
- Defining the goals of the pilot plant
- Identifying key issues
- Selecting the appropriate strategy
- Developing a design basis
- Prototype concerns and implications

P&IDs
- Process flow diagrams
- P&ID standards
- Symbology

Pilot Plant Cost Factors
- Practical effects of budget constraints
- Estimating pilot plant design and construction costs
- Estimating start-up costs
- Estimating operating costs
- Frequently overlooked cost factors
- Reducing pilot plant costs

Pilot Plant Scheduling
- Crash programs
- Effective scheduling

Types of Space Suitable for Pilot Plant Operations
- Separate buildings
- Containment cells
- Open bays
- Hoods and laboratory areas
- Estimating pilot plant space requirements

Pilot Plant Design
- Design approaches
- Differences from process plant design
- Developing a pilot plant design specification
- Options for designing and constructing a pilot plant

Pilot Plant Control Systems
- Determining system requirements
- Selecting the right control system
- Types of computer control systems

Instrumentation of Special Interest to Pilot Plant Operations
- Gas and liquid flow measurement
- Liquid level measurement
- Temperature measurement
- Pressure measurement

Pilot Plant Start-up
- Differences from major process unit start-up
- Optimizing start-up efforts
- Start-up resources

• Start-up sequences
• Equipment
• Calibration
• Turn-key vs. in-house start-up
• Flushing
• Leak testing

Pilot Plant Maintenance
- Advantages of good maintenance
- Types of maintenance
- How to minimize maintenance costs
- Typical maintenance costs
- In-house or contracted maintenance

Summary

Course Schedule
Registration and course will be held at Courtyard Houston NASA/Clear Lake
18100 Saturn Lane
Houston, TX

Day 1
8:00 a.m. to 8:15 a.m. Registration
8:15 a.m. to 4:30 p.m. Class

Day 2
8:00 a.m. to 4:30 p.m. Class

Day 3
8:00 a.m. to 12:00 p.m. Class
Midmorning refreshment breaks will be provided all three days. Midafternoon refreshment breaks and noon lunch will be provided on days 1 and 2.

What Past Participants Say About This Course

“I WAS LOOKING FOR A GOOD OVERVIEW AND THIS COURSE DELIVERED.”
Pilot Plant Operations Superintendent

“THE THREE DAYS IN CLASS PROVIDED MORE INFORMATION THAN WORKING ON THE JOB FOR THE PAST YEAR!”
Research Engineer

“This course gave me an excellent base to work from. The notes are a valuable resource and reference.”
Research Scientist

“Rich is a passionate instructor, who provided a very practical course, packed with real-world examples.”
Senior Research Technician

Pilot Plant Certificate Series
The Pilot Plant Certificate (PPC) series features practical, problem-solving courses that help new and experienced professionals keep pace with the latest innovations, codes, and technology in industrial pilot plants, laboratories, and research facilities.
You can earn your PPC by attending four core courses and one elective from the course list. Attend as many courses as you wish, in any order, without obligation to the certificate. The choice is yours.

Core Courses
- Pilot Plant Design, Construction, and Operation
- Pilot Plant Equipment
- Pilot Plant and Laboratory Safety
- Hazard Analysis and Risk Assessment for Pilot Plants, Laboratories, and Research

Elective Courses
- Laboratory Design
- Process Safety: The Technical Basis

How You’ll Benefit
The PPC offers top-quality training for pilot plant professionals, researchers, project engineers, EHS professionals, supervisors, operators, and professionals with related research, product, process, or facility responsibilities. Courses cover relevant pilot plant and laboratory topics including safety, codes, equipment, design, construction, start-up, and operations.

Take the Next Step
Industry experts and faculty with firsthand experience guarantee you a dynamic learning experience at an affordable price. Discuss challenges, get answers, share ideas and return to your job a more knowledgeable and valuable professional.
For more information, email Elaine Bower bower@engr.wisc.edu or call her at 800-462-0876.
Course Information

- Please enroll me in Pilot Plant Design, Construction, and Operation Course #P612 November 5–7, 2014 in Houston, Texas Fee: $1795
- Team Discount: $1650 per person when two or more enroll from the same organization.
- I cannot attend at this time. Please send me brochures on future courses.

Personal Information

Name ____________________________
Title ____________________________
Company _________________________
Address __________________________
City/State/Zip _____________________
Phone (_____) __________________ __ Fax (_____)
E-mail ____________________________

Future Courses

For information about the following courses, contact Elaine Bower, Program Director, at 800-462-0876, or e-mail her at bower@engr.wisc.edu.

- Powder and Bulk Mixing: Processes, Applications and Equipment September 23–25, 2014
- Chemical Engineering for Non-Chemical Engineers September 29–October 1, 2014
- Dryer Technology October 20–21, 2014
- Atomization and Spray Technology: Focus on Spray Drying October 22, 2014
- Evaporators: Designing, Evaluating, and Operating November 11–12, 2014
- Industrial Crystallization Operations November 13, 2014

Need to Know More?

Call toll free 800-462-0876 and ask for
Program Director: Elaine M. Bower
bower@engr.wisc.edu
Program Associate: Theresa Rodger
rodger@epd.engr.wisc.edu
Or e-mail rustserv@epd.engr.wisc.edu

General Information

Fee of $1795 Covers Notebook, course materials, break refreshments, lunches on Day 1 and 2, and certificate. We do not publish proceedings. Course materials are distributed only to participants.

Cancellation If you cannot attend, please notify us by October 19, 2014, and we will refund your fee. Because this course has limited enrollment, cancellations received after this date and no-shows are subject to the full course fee of $1795. You may enroll a substitute at any time before the course starts.

Location and Accommodations This course will be held at the Courtyard Houston NASA/Clear Lake, 18100 Saturn Lane, Houston, TX. We have reserved a block of guest rooms (rates starting at $109) at the Courtyard NASA/Clear Lake. Reserve a room online at epd.engr.wisc.edu/lodgingP612, or call 281-333-0220 by October 19 and request Group Code.

Earn Continuing Education Credits By participating in this course, you will earn 20 Professional Development Hours (PDH), 2.0 Continuing Education Units (CEU), or 20 AIA Learning Units (LU).