Pilot Plant Design, Construction, and Operation

November 4–6, 2013
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

For the chemical, pharmaceutical, and food process industries
Pilot Plant Design, Construction, and Operation
November 4–6, 2013
Houston, Texas
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

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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
The text for this course is *Pilot Plant Design, Operation and Construction*, by Richard P. Palluzi, McGraw-Hill Publishing Co., 1992, and is included in the course fee.

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
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 is 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

Schedule Note
Registration will begin at 8:00 a.m. on Monday, November 4, 2013 at the Courtyard by Marriott Houston NASA/Nassau Bay, Houston, TX. The course will meet from 8:15 a.m. to 4:30 p.m. on Monday, from 8:00 a.m. to 4:30 p.m. on Tuesday and from 8:00 a.m. to noon on Wednesday. The daily schedule will include midmorning and midafternoon refreshment breaks and lunch at noon, Monday and Tuesday.

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).

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

Past Participating Companies
Air Products and Chemicals, Inc.
Archer Daniels Midland Company
BP
Bristol Myers Squibb Company
Celanese Ltd.
Chevron Corporation
ConocoPhillips Company
Elevance Renewable Sciences, Inc.
ExxonMobil Corporation
FMC Corporation
Halliburton
Integra Lifesciences
Kraton Polymers
Mary Kay, Inc.
Mead Johnson Nutritionals
Pepperidge Farm, Inc. (Campbell’s Soup)
Schlumberger
Shell Canada Ltd.
Shell Global Solutions
SK Energy
University of Calgary
W.R. Grace & Company
Zeton Inc.

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Four Easy Ways to Enroll

Internet: epd.engr.wisc.edu/webP063
Phone: 800-462-0876 or 608-262-1299 (TDD 265-2370)
Mail to: The Pyle Center
Attn: Engineering Registration
702 Langdon Street
Madison, Wisconsin 53706
Fax: 800-442-4214 or 608-265-3448

Course Information

☑ Please enroll me in Pilot Plant Design, Construction, and Operation
Course #P063 November 4–6, 2013 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.

Limited Enrollment

Personal Information (Please print clearly.)

Name ____________________________
Title _______________________________
Company __________________________
Address ____________________________
City/State/Zip _______________________
Phone (_____) ______________________ Fax (_____) ____________________
E-mail _____________________________

Additional Enrollees

Name ______________________________
Title ______________________________
E-mail ____________________________

Billing Information

☑ Bill my company ☐ P.O. or check enclosed (Payable in U.S. funds to UW–Madison)

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☐ Please check the box if you are a person with a disability and desire special accommodations. A customer service representative will contact you. Requests will be kept confidential.

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From mailer panel.

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 17–19, 2013
Dallas, Texas
Course #P056

Pumps and Process Piping
September 23–24, 2013
Chicago, Illinois
Course #P057

Chemical Engineering for Non-Chemical Engineers
September 30–October 2, 2013
Chicago, Illinois
Course #P058

Laboratory Design
October 7–9, 2013
Orlando, Florida
Course #P059

Dryer Technology
October 22–23, 2013
Madison, Wisconsin
Course #P060

Atomization and Spray Technology: Focus on Spray Drying
October 24, 2013
Madison, Wisconsin
Course #P061

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 custserv@epd.engr.wisc.edu

General Information

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

Cancellation If you cannot attend, please notify us by October 28, 2013, 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 by Marriott Houston NASA/Nassau, 18100 Saturn Lane, Houston, TX. We have reserved a block of guest rooms (rates starting at $109) at the Courtyard by Marriott Houston NASA/Nassau Reserve a room online at epd.engr.wisc.edu/lodgingP063, or call 281-333-0220 by October 21 and request Group Code PPDC.

Related Courses

Laboratory Design
October 7–9 2013
Course #P055

During this course, you will gain a working knowledge of laboratory design for functionality, laboratory use requirements, codes and regulations that impact laboratory design, renovation as an alternative to new construction, and general laboratory safety issues.

Pilot Plant Equipment
Spring 2014

During this course, you will focus on common pilot plant equipment, including piping, reactors, seals, controls for reactors, valves, pumps, sampling systems, heat tracing, and drivers. You will discuss the issues involved in correctly designing and installing this equipment and explore troubleshooting methods and options.

Pilot Plant and Laboratory Safety
Spring 2014

During this course, you will learn how to develop and implement an effective safety program for your labs and pilot plants. You will gain a comprehensive overview of applicable safety codes, including OSHA, NFPA, and ASME; flammability basics and how they influence safety and safety programs; safety systems and interlocks; and gas monitoring systems.

For details see epd.engr.wisc.edu/chemicaleng