petroEDGE

GAS-LIFT DESIGN, OPERATION & AUTOMATION

18 – 22 JULY 2011, KUALA LUMPUR, MALAYSIA

Your Expert Trainer: Cleon L. Dunham

Over 36 years of experience with Shell Oil Company (USA) and Shell International E&P focused on oilfield automation and optimisation. Previous co-ordinator of oilfield automation and artificial lift for Shell's world-wide producing operations.

www.petroedgeasia.net

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Course Description

The objective of this course is to provide the most advanced and comprehensive gas lift design and operations training available to the industry. It also emphasizes emerging technology in the form of actual gas lift valve performance and dynamic gas lift simulation, which advance the practice of gas lift from a black art to a true engineering discipline. The course will also prove valuable to experienced gas lift engineers who would benefit from exposure to some of the newer methods currently being developed and tested by the industry.

This five-day course will give an introduction to gas-lift design, operation, and automation. The course attendees will learn the importance of:

- The fundamentals of the gas-lift process
- Understanding inflow and well performance
- How gas-lift valves work and gas-lift valve mechanics
- Gas-lift design with a hands-on manual design exercise and awareness of gas-lift design software
- Gas-lift surveillance and troubleshooting tools and techniques
- Production facilities associated with gas-lift
- Gas-lift automation. – its purpose, value, and use in optimizing gas-lift operations.

The learning objectives from this course include understanding:

- Where and when to use gas-lift
- How to use gas-lift
- The requirements for effective gas-lift equipment selection and design
- The importance of good gas-lift surveillance and troubleshooting
- The role of production facilities to achieve effective gas-lift operations
- The business drivers and benefits of using a production automaton system for gas-lift
- How to obtain follow-up training in gas-lift design, operation, and automation.

Who Should Attend:

- Mid-level managers in Operating Companies who are responsible for fields and staff associated with artificial lift
- Field supervisors in fields where gas-lift is or may be used
- Artificial lift engineers who are or may be associated with gas-lift and responsible for equipment and/or software selection and gas-lift design
- Facility engineers who are associated with fields that use or may use gas-lift
- Well analysts who are or may be involved in gas-lift surveillance and troubleshooting

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5 Day Course Outline in Detail:

1. **Course Introduction**
   a. Course Outline & Daily Schedule
   b. Introduction to Gas-Lift as a Method of Artificial Lift

2. **Inflow Performance**
   a. Why It is Important to Know Inflow Performance
   b. Inflow Performance Relationships
   c. Well Performance Fundamentals

3. **Types of Gas-Lift**
   a. When Each Type of Gas-Lift is Used
   b. Types of Gas-Lift: Single String, Dual String, Intermittent, Plunger Assisted
   c. Gas-Lift for Gas Wells

4. **Types of Gas-Lift Configurations**
   a. Which Configuration is Most Beneficial
   b. Parallel
   c. Sequential
   d. Mixed

5. **Oil and Gas Properties**
   a. Which Properties are "Need to Know" for Gas-Lift
   b. Oil Properties
   c. Gas Properties Related to Gas-Lift

6. **Multiphase Flow**
   a. Why This is Essential Information for Gas-Lift
   b. Gradient Curves – Brief Historical Perspective
   c. Vertical Two-Phase Correlations – Choosing the "Right" One
   d. Calibration of Gradient Curves – An Essential Step

7. **Gas-Lift Valve Mechanics**
   a. Knowing the Valves is at the "Heart" of Gas-Lift Design
   b. What Type of Valve is Best for Each Application
   c. Types of Gas-Lift Valves
   d. API Designation
   e. Opening / Closing Pressure
   f. Temperature Effects
   g. Valve Setting Recommendations
   h. Gas-Lift Valve Models
   i. Routine Valve Testing Before Running, After Pulling
   j. Testing & Modeling GL Valves
   k. Valve Testing Philosophy
   l. Using a Choke in Unloading Valves

8. **Gas-Lift Design**
   a. Designing the Depth of the 1ST Gas-Lift Unloading Valve
   b. Design Example, Locating Mandrels, Calculating Flow Through Valves, and Setting Bellows Pressure
   c. Manual Gas-Lift Design Exercise – To Understand what the Software Does
   d. Commercial Gas-Lift Design Software Packages

9. **Gas-Lift Surveillance and Troubleshooting Methods**
   a. Many Problems can Occur – How Can They Be Found and Analyzed
   b. Two Pen Recorders
   c. System Trouble Shooting
   d. Gas-Lift Stability
   e. Troubleshooting Flow Chart
   f. Gas-Lift Automation (SCADA) System - Covered in More Detail Later
   g. Analysis of Pressure Surveys

10. **Allocation**
    a. When is Gas-Lift Allocation Required
    b. Allocation Concerns
    c. Allocation Formulas

11. **Recommended Practices**
    a. What are some Established Industry Recommended Practices
    b. API Recommendations
    c. Unloading Recommendations
    d. Optimization Recommendations
    e. Two Pen Recommendations
    f. Dealing with Instability

12. **Production Facilities Associated with Gas-Lift**
    a. Gas-Lift Gas Compression
    b. Gas-Lift Gas Dehydration
    c. Gathering Systems
    d. Distribution Systems
    e. Production Facilities
    f. Well Test Facilities

13. **Gas-Lift Automation**
    a. Gas-Lift Automation is Essential to Make the Most of the System
    b. Introduction to Gas-Lift Automation
    c. Automation Objectives Related to Gas-Lift
    d. Automation Applications Related to Gas-Lift
    e. Automation Justification and Benefits
    f. Automation Components – Hardware, Software
    g. Automation Staffing
    h. Automation Project Planning
    i. Automation Trends

14. **Training / Knowledge Transfer**
    a. Workshops
    b. Web-Based Training
    c. Valve Performance Clearinghouse
    d. API Gas-Lift Recommended Practices
    e. ISO Gas-Lift Standards and Specifications
    f. Gas-Lift References
    g. Gas-Lift Meetings

15. **Recent Developments**
    a. What are Some of the "Recent" Gas-Lift Developments
    b. Downhole Flow Control Valve
    c. Gas-Lift/Jet Pump
    d. Nova Venturi Orifice
    e. Schlumberger Look at Future
    f. Electric Gas-Lift Valve
    g. Shell Gas-Lift R&D
    h. Shell Look at Future

Your Expert Trainer: **Cleon L. Dunham**

Cleon is President and CEO of the Artificial Lift R&D Council, founded 2001, focused on oil and gas production automation and artificial lift.

Dunham retired from Shell Oil Co. after a 36-year career in facility engineering, reservoir engineering, production engineering and computer control engineering, with a primary focus on production automation and artificial lift.

He spent the past five years of his career with Shell International E&P in The Hague, Netherlands, where he helped coordinate Shell's worldwide production automation and artificial lift activities.

He is a member of work groups of both the American Petroleum Institute and International Standards Organization for writing standards and recommended practices for gas lift. Dunham holds a B.S. in engineering from Cornell University.

About petroEDGE

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To learn more about us, visit www.petroedgeasia.net

Gas-lift Design, Operation & Automation
Registration Form

Kuala Lumpur, Malaysia	Early Bird Price	√	Normal Price	√	
5- day – Gas-Lift, Operation and Automation	**S$ 4399**		**S$ 4599**		**TEAM DISOUNTS** PetroEdge recognises the value of leaning in teams. Group bookings at the same time from the same company receive the following: 3 or more at 5% off 5 or more at 7% off 8 of more at 10% All other promotions including early bird is exclusive of the group discount.
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