Gas Lift Operation, Troubleshooting Design, and Automation

Optimize oil production through the application of various troubleshooting techniques in gas lift operation

**Date:** 16th - 19th March 2015  
**Location:** Kuala Lumpur, Malaysia

**Petrosync Distinguished Instructor**  
**Cleon Dunham**  
President, Oilfield Automation Consulting  
President & CEO, Artificial Lift R&D Council

- 36 years of experience in Shell Oil Company & Shell International EP  
- President of Oil Field Automation Consulting(OAC which is founded on 2000).  
- Training Consultant in Oilfield Automation Consulting (OAC)  
- Founder of Artificial Lift R&D Council (ALRDC)  
- Secretary of American Petroleum Institutes (API) & International Standards Organisations (ISO)

**Masterclass Objectives**

- PERFORM well evaluation by enhancing solutions for both continuous & intermittent flow applications to improve well performance.
- DIAGNOSE & troubleshoot the problems faced throughout the process of gas lift by using different diagnosis tools such as 2/3 pen recorders, winGLUE software & gas lift performance curve.
- IDENTIFY major causes of gas lift operation problems to minimize the downtime in troubleshooting gas lift operation.
- BUILD better skills in handling all the gas lift equipment such as dual string, smart gas lift valve, automatic close loop & etc.
- PROVIDE an up-to-date review on the latest technology in gas lift system & evaluation in real life case studies to achieve improved troubleshooting skills

**Specially Designed for**

This course is designed for oil n gas personnel who works in fields that uses or may use gas lift system:

- Production Operators  
- Wireline Operators  
- Well Analysts  
- Production Engineers  
- Production Technologists  
- Facility Engineers

**Prerequisites**

Participants are expected to have basic knowledge in gas lift operations.
Masterclass Overview

This four-day course delivers the best practices & development of covering from gas-lift operation, design, troubleshooting, and automation. The course attendees will learn the essentials of how gas-lift processes and valves installation improve efficiency and productivity. Learning the valve mechanics of gas lift will also help integrate the flow control system for improve productivity. Using a choke in unloading valve will be discuss during the class and it provides accurate predictions of the gas passage through the choked valve during the unloading process.

The topics also cover on how to perform and maximise utilization of gas-lift surveillance, troubleshooting tools and techniques to achieve optimal productivity and minimise operational costs. Additionally, a hands-on manual gas lift design exercise and software application will also be taught during the workshop. At the end of this course, attendees will gain knowledge on applying best practices and effective development of gas lift operations.

Knowledge Transfer Methodologies

The class will be delivered with a balanced mix of practical evaluation projects and lecture series. Short class exercises illustrating important concepts will also be done across sessions. For case studies and exercises, we will focus on methods used for Gas-Lift Surveillance and Troubleshooting such as calculation, WinGLUE software, gas lift performance curve, and two-pen recorders methods. There also will be a comprehensive exercise on performing gas-lift design. The course also includes a number of videos of various gas-lift equipment and processes. API Gas-Lift Recommended Practices and ISO Gas-Lift Standards and Specifications will be covering during the workshop.

Topics covered over this 4-days course

Introduction to Gas-Lift as a Method of Artificial Lift
Types of Gas-Lift
- When Each Type of Gas-Lift is Used
- Types of Gas-Lift: (Single String, Dual String, Intermittent)
- Types of Gas-Lift Configurations
- Which Configuration is Most Beneficial: Parallel, Sequential and Mixed

Gas-Lift Valve Mechanics: Knowing the Valves is at the “Heart” of Gas-Lift Design
- What Type of Valve is Best for Each Application
- API Designation
- Temperature Effects: Opening & Closing Pressure
- Testing & Modeling GL Valves: Setting Recommendations
- Routine Valve Testing Before Running, After Pulling
- Using a Choke in Unloading Valves

Production Facilities Associated with Gas-Lift
- Gas-Lift Gas Compression and Dehydration
- Gathering Systems and Distribution Systems
- Production and Well Test Facilities

Gas-Lift Design
- Designing the Depth of the 1ST Gas-Lift Unloading Valve
- Design Example:
  - Locating Mandrels
  - Calculating Flow Through Valves
  - Setting Bellows Pressure
- Manual Gas-Lift Design Exercise: To Understand what the Software Does

Allocation
- When is Gas-Lift Allocation Required
- Allocation Concerns
- Allocation Formulas

Gas-Lift Surveillance and Troubleshooting Methods
- Problem Analysis Methods:
  - WinGLUE software
  - Gas-lift performance curve (NODAL analysis)
- Diagnostic Tools: Calculations, well-sounding devices, tagging fluid level, two-pen recorder charts and flowing pressure survey
- Two Pen Recorders and Measurement Methods
  - Where to Install a Two-Pen Recorder
  - Interpretation of Two-Pen Recorder Charts
- System Troubleshooting
- Gas-Lift Stability
- Troubleshooting Flow Chart
- Gas-Lift Automation (SCADA) System - Covered in More Detail Later
- Analysis of Pressure Surveys
- CO2 Method for Determining Depth of Injection or Leaks

Gas-Lift Automation
- Gas-Lift Automation is Essential to Make the Most of the System
- Introduction to Gas-Lift Automation
- Automation Objectives Related to Gas-Lift
- Automation Applications Related to Gas-Lift
- Automation Justification and Benefits
- Automation Components — Hardware, Software
- Automation Staffing
- Automation Project Planning
- Automation Trends

Recommended Practices
- What are some Established Industry Recommended Practices
- API Recommendations
- Unloading Recommendations
- Optimization Recommendations
- Two Pen and Measurement Recommendations
- Dealing with Instability

Recent Developments
- What are Some of the “Recent” Gas-Lift Developments
- Downhole Flow Control Valve
- Gas-Lift/Jet Pump
- Nova Venturi Orifice
- Schlumberger Look at Future
- Electric Gas-Lift Valve
- Shell Gas-Lift R&D and Future Plan
Cleon Dunham is a President of Oilfield Automation Consulting which is founded in 2000. He is also a President & CEO of Artificial Lift R&D Council which is founded in 2001. Cleon Dunham has 30 years of experience in Oilfield Automation & Optimization. He has working experience of 36 years in Shell Oil Company (USA) and Shell International Exploration Production, with primary focus on production operations, engineering & technology and gas lift operation. He had designed and implemented gas lift automation systems, water flood injection automation systems, CO2 & Steam Injection Automation Systems. He has also been a coordinator of Oilfield Automation and artificial lift for Shell's world-wide producing operations.

Cleon Dunham also provides consulting services to evaluate existing oilfield automation systems and to plan for new oilfield automation systems. Gas Lift Training and awareness classes are also provided by him in Argentina, Bolivia, Singapore, Kuala Lumpur, Vietnam. Currently, Cleon helps in defining and designing new oilfield automation products, testing and qualifying new products. Besides that, he is also an author and co-author of numerous automation and artificial lift articles.

Cleon Dunham holds Bachelor of Engineering from Cornell University. He has been awarded four patents and numerous awards from Society of Petroleum Engineering, American Society of Mechanical Engineering, and others. He has many related recent projects in hands and and he is active in numerous organisations. Numerous awards from Society of Petroleum Engineering, American Society of Mechanical Engineering, and others such as for teaching, various presentations & conferences & journals.

**List of clients:**
- Shell Oil Company
- Shell International EP
- API Gas-Lift Task Group
- ISO Gas-Lift Work Group
- Gas-Lift Workshop Steering Committee
- BP Offshore Louisiana Gas-Lift Project
- Shell Gas-Lift Automation Documentation System

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