Gas Lift System Production Optimization

Enhance Production Level Through Gas Lift System Design, Diagnosis, and Troubleshooting
6th October 2014 - 10th October 2014 at KUALA LUMPUR, MALAYSIA

PetroSync Distinguished Instructor
DR GABOR TAKACS
Head of Petroleum Engineering Department
University of Miskolc

- Consultant and Lecturer with over 30 years of experience in the Oil & Gas industry
- Specializes in Production Engineering and Artificial Lift
- Author of “Gas Lift Manual” (2005) by PennWell Books, USA
- Chairman of SPE Artificial Lift Technical Interest Group for 7 Years (1997-2003)
- Conducted various well-received production optimization courses around the world
  including Gas Lift System, Advanced ESP Design, and Advanced Sucker-Rod Pumping

Author of Books in Artificial Lift Technology

Gas Lift Manual (2005) - PennWell Books, USA
Sucker-Rod Pumping Manual (2003) - PennWell Books, USA
Electrical Submersible Pumps Manual (2009) - PennWell Books, USA

Course Objectives
- LEARN to optimize production through gas lift system design, analysis, and troubleshooting
- APPLY techniques in gas lift operations from beginning to end of operations
- MANAGE challenging environment faced by gas-lifted wells
- OVERCOME the limitations and problems faced in applying these optimization techniques
- OPTIMIZE operations through understanding gas lifting’s role in the whole production system
- GAIN practical skills in valve mechanics and NODAL analysis
- INTEGRATE gas lift system best operation practices with production optimization

Specially Designed for
The course is designed for, but not limited to, production technologists, petroleum engineers, and production engineers, who are directly involved with gas lift system operations
- Production Technologists
- Petroleum Engineers
- Field Operators
- Lifting Executives
- Production Engineers
- Maintenance Engineers

Supported by
Gas Lifting is considered to be one of the most flexible and cost-effective artificial lift systems. The optimum level of production rates versus lifting depth achieved for this system is unmatched. This system is best used for highly deviated wells producing sand, for wells with high formation of gas and liquid ratios, and for wells with multiple completions. Thus, optimizing production levels for these wells is one of the most important concerns of oil and gas companies. As oil wells mature, engineers face bigger challenges in recovering oil. One of the most common techniques used for improving crude production is through gas lifting. Because of its low operating cost and the flexibility of production that it provides, many companies are involved with this system. However, several factors limit the effectiveness of gas lifting, as different reservoirs are faced with variable pressure levels, temperature, and depositions. Therefore, as operations take place, the need for continuous system design, diagnosis, and troubleshooting arises in order to optimize production levels.

This course addresses the above areas of gas lifting operations. It gives a complete look on the operational activities which will enable field operators to fully optimize even from systems selection, design, and installation. Moreover, the course will then focus on the techniques in achieving production optimization, specifically with continuous flow installations, monitoring, and run-life optimization. In order to achieve optimal levels of production, NODAL analysis will be used in order to analyze and troubleshoot gas lifted wells. Hands-on class exercises and case studies will also be presented in order to test the participants' application of the concepts learnt in the course into situational instances of field operations.

### Course Content

**Day One: Artificial Lift Methods & Introduction to Gas Lift System**

**Introduction to Artificial Lift Methods**
- Importance and Short History of Artificial Lifting
- Comparison of Lift Methods
- Basic Feature of Lift Methods

**Multiphase Flow in Oil Wells**
- Background Theories
- Calculation of Pressure Traverses
- Accuracy and Selection of Pressure Drop Calculation Models
  - Class Exercises: Use of Gradient Curve
  - Class Exercises: Computer Solutions

**Basic of Nodal Analysis**
- The Production System and its Behavior
- Basic Principles and Solutions

**Gas Lift’s Role in the Production System**

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**IN-HOUSE SOLUTIONS**

**SAVE COST • IMPROVE PERFORMANCE • REDUCE RISK**

PetroSync understands that in current economic climate, getting an excellent return on your training investment is critical. This training can be conducted exclusively for your organization. The training can be tailored to meet your specific needs at your preferred location and time. We will meet you anywhere around the globe.

If you like to know more about this program, please contact Jerry Tay (Conference Director) on +65 6415 4502 or email jerry.t@petrosync.com
Over the years, there has been a growing demand for hybrid training programs. It is an excellent option to maximize your training dollar for your specific training needs. We make it possible to run a training program that is customized totally to your training needs at a fraction of an in-house budget!

If you like to know more about this program, please contact us on +65 6415 4500 or email general@petrosync.com

**GAS LIFT SYSTEM PRODUCTION OPTIMIZATION**

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**Day Two: Gas Lift Installations**

**Gas Lift Installation Types**
- Tubing Flow Installations
  - Open Installation
  - Semi-Closed Installations
  - Closed Installations
  - Chamber Installations
  - Casing Flow & Other Installations

**Gas Lift Valves**
- Gas Lift Valve Types
- Supporting Calculations
- Valve Mechanics of IPO and PPO Valves

**Class Exercise: Valve Mechanics**
- Dynamic Performance of Gas Lift Valves
- Gas Throughput (API RP 11V2)

**Class Exercise: Gas Throughput Calculations**
- Setting of Gas Lift Valves

**Design of Continuous Flow Gas Lift Installations**
- Principles of Continuous Flow Gas Lifting
- Installation Design Calculations

**Class Exercise: Installation Calculations**
- The Effects of Operational Parameters

**New Developments in Gas Lifting**

**Day Three: NODAL Analysis & Application**

**NODAL Analysis of Continuous Flow Gas Lifted Wells**
- Description of System Performance
- Constant Wellhead Pressure Cases

**Class Exercises: Wellhead Pressure**
- Unlimited & Limited Lift Gas Availability
- Variable Wellhead Pressure Cases
- The Equilibrium Curve Method

**Class Exercises: Equilibrium Curve**
- System Stability

**Optimization of Continuous Flow Gas Lift Installation (Part 1)**
- Basic Principles
- Optimization of Single Well for Prescribed Liquid Rate

**Class Exercises: Compressor**
- Existing Compressor
- Selection of Compressors

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**PROGRAM SCHEDULE**

<table>
<thead>
<tr>
<th>Time</th>
<th>Activity</th>
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</thead>
<tbody>
<tr>
<td>08:00 – 09:00</td>
<td>Registration (Day 1)</td>
</tr>
<tr>
<td>09:00 – 11:00</td>
<td>Session I</td>
</tr>
<tr>
<td>11:00 – 11:15</td>
<td>Refreshment &amp; Networking Session I</td>
</tr>
<tr>
<td>11:15 – 13:00</td>
<td>Session II</td>
</tr>
<tr>
<td>13:00 – 14:00</td>
<td>Lunch</td>
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<tr>
<td>14:00 – 15:30</td>
<td>Session III</td>
</tr>
<tr>
<td>15:30 – 15:45</td>
<td>Refreshment &amp; Networking Session II</td>
</tr>
<tr>
<td>15:45 – 17:00</td>
<td>Session IV</td>
</tr>
<tr>
<td>17:00</td>
<td>End of Day</td>
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</tbody>
</table>

HYBRID TRAINING SOLUTIONS

FOCUS TRAINING • REDUCE COST • ENHANCED RESULTS

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Day Four: Optimization of Continuous Flow Gas Lift installation

Optimization of Continuous Flow Gas Lift Installation (Part 2)
- Single-Well Optimization for Unlimited Rate
- The Economic Slope Method
- Allocation of Lift Gas to a Group of Wells
- The Equal Slope Method

Class Exercises: Equal Slope

Unloading Design for Continuous Flow
- The Unloading Process
  (Video Presentation)
- Valve String Designs

Class Exercises: Valve String Design
- Valve Running and Pulling
  (Video Presentation)

Day Five: Continuous Flow Analysis & Troubleshooting

Gas Lift Systems
- Function, Types
- System Operation
- Optimum System Design

Analysis and Troubleshooting Continuous Flow Gas Lift Wells
- Troubleshooting Tools and their Use
  - Two-Pen Pressure Recordings
  - Downhole Pressure and Temperature Surveys
  - Acoustic Surveys
- Common Gas Lift Malfunctions
  - Tackling Challenging Environments
  - Downhole Problems
  - Distribution and Gathering System Problems

Case Study: Optimizing the Operating Conditions in a Major Gas-Lifted Field

Petrosync Quality

Limited Attendees
The course has limited seats to ensure maximum learning and experience for all delegates.

Certificate of Attendance
You will receive a Certificate of Attendance bearing the signatures of the Trainer upon successful completion of the course. This certificate is proof of your continuing professional development.

Interactive Training
You will be attending training designed to share both the latest knowledge and practical experience through interactive sessions. This will provide you with a deeper and more long-term understanding of your current issues.

High Quality Course Materials
Printed course manual will provide you with working materials throughout the course and will be an invaluable source of reference for you and your colleagues afterward. You can follow course progress on your laptop with soft copies provided.
Dr. Gabor Takacs is a well-known consultant and instructor on Production Engineering and Artificial Lift topics, with over 30 years of teaching and consulting experience. He has conducted various courses and provided consultation services for oil companies in Middle East, South America, Eastern Europe, and Asia.

Dr. Takacs was selected as SPE Distinguished Lecturer and Outstanding Technical Editor for the SPE journal “Production and Facilities.” His organizational involvements and positions include the following:

- Member of Hungarian National Committee, World Petroleum Congress (2002-2007)
- Technical Editor, SPE Production and Operations (2009)
- Chairman, SPE Hungarian Section (1992-1994)

He has more than 90 technical papers to his credit, and holds a Hungarian Patent No.200 236 on Pressure Operated Single Element Gas Lift Valve. He has authored the following books on Artificial Lift technology, which were all published by PennWell Books, USA.


Dr. Takacs is currently the Head of the Petroleum Engineering Department at the University of Miskolc in Hungary. He was previously the acting director at the Petroleum Engineering Department at the Petroleum Institute in Abu Dhabi, UAE. He also taught at Texas Tech University, USA, and at the Mining University of Leoben, Austria.
**Course Details**

**Title:** Gas Lift System Production Optimization  
**Date:** 6TH - 10TH October 2014  
**Location:** Kuala Lumpur, Malaysia

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**INVESTMENT PACKAGES**

<table>
<thead>
<tr>
<th>Investment Package</th>
<th>Deadline</th>
<th>Full Masterclass</th>
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</thead>
<tbody>
<tr>
<td>Standard Price</td>
<td>3RD OCT 2014</td>
<td>SGD $ 5,995</td>
</tr>
<tr>
<td>Early Bird Offer</td>
<td>12TH SEP 2014</td>
<td>SGD $ 5,795</td>
</tr>
<tr>
<td>Group Discount (3 or more Delegates)</td>
<td>3RD OCT 2014</td>
<td>10% discount for groups of 3 registering from the same organization at the same time</td>
</tr>
</tbody>
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* To enjoy the promotion & discount offer, payment must be made before deadline  
* For 7 or more delegates, please inquire for more attractive package.  
* Prices include lunches, refreshments and materials. Promotion & discount cannot be combined with other promotional offers.  
* Important: Please note that registration without payment will incur a SGD 200 administration fee.

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**DELEGATES DETAILS**

**1st Delegate Name**  
Mr ☐ Mrs ☐ Ms ☐ Dr ☐ Others ☐  
Direct Line Number:  
Job Title:  
Head of Department:  
Address:  
Country:  
Email:  

**2nd Delegate Name**  
Mr ☐ Mrs ☐ Ms ☐ Dr ☐ Others ☐  
Direct Line Number:  
Job Title:  
Head of Department:  
Address:  
Country:  
Email:  

**3rd Delegate Name**  
Mr ☐ Mrs ☐ Ms ☐ Dr ☐ Others ☐  
Direct Line Number:  
Job Title:  
Head of Department:  
Address:  
Country:  
Email:  

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**INVOICE DETAILS**

Attention Invoice to:  
Direct Line Number:  
Company:  
Industry:  
Address:  
Country:  
Postcode:  
Email:  
Fax:  

Please note:  
- Indicate if you have already registered by Phone  
- If you have not received an acknowledgement before the training, please call us to confirm your booking.

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**PAYMENT METHODS**

☐ By Credit Card :  
- Please debit my credit card:  
  - Visa  ☐ MasterCard ☐ AMEX ☐  
  - Security Code:  
  - Card Number:  
  - Expiry Date:  

☐ By Direct Transfer :  
- Please quote invoice number(s) on remittance advice

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**CHARGES & FEE(s)**

- For Payment by Direct Telegraphic Transfer, client has to bear both local and overseas bank charges.  
- For credit card payment, there is an additional 4% credit card processing fee.

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**Course Confirmation**

I agree to PetroSync’s terms & conditions, payment terms and cancellation policy.

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**Authorized Signature:**  

**PAYMENT TERMS** : Payment is due in full at the time of registration. Full payment is mandatory for event attendance.

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**DATA PROTECTION**

The information you provide will be safeguarded by PetroSync that may be used to keep you informed of relevant products and services. As an international group we may transfer your data on a global basis for the purpose indicated above. If you do not want us to share your information with other reputable companies, please tick this box.

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Please note that trainers and topics were confirmed at the time of publishing; however, PetroSync may necessitate substitutions, alterations or cancellations of the trainers or topics. As such, PetroSync reserves the right to change or cancel any part of its published programme due to unforeseen circumstances. Any substitutions or alterations will be updated on our web page as soon as possible.

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