Gas Production Engineering

Instructor
Mr. Ron Roberts / Esanda Engineering

Objectives
To gain an understanding of the latest technologies and characteristics of gas reservoirs, well, subsurface and surface facilities, the estimation of gas production and its behavior.

- Understand and apply relevant legal, mandatory and contractual requirements
- Understand Gas Plant Equipment and establish trouble-shooting techniques
- Understand gas treatment facilities and techniques for optimizing to sales quality specification
- Improve knowledge in gas process streams, pressure and flow measurement
- Gain and apply knowledge in gas volumes production and sales management
- Discuss examples of real-life gas treatment problems and Case Histories and their impact on reservoir and gas plant operations
- Discuss innovative techniques to maintain / restore high productivity
- Develop and implement a robust maintenance and monitoring program
- Understand types of flowlines, gathering systems, separation, pumps, compressors, valves and their operating problems

Course Outline
The outline of the course is tailored and balanced to satisfy JOGMEC requirements whilst recognizing the knowledge level of the workshop attendees. The prescribed course outline will be adhered to as much as possible, but where attendees raise specific and relevant issues from their own place of work these will be addressed during course-work.

It is important that relevant gas production items falling out-with the course outline as raised by attendees are captured within the course. These issues will be discussed and investigated to the point where suitable and attainable solutions are realized. The outline includes (but is not limited to) the following issues:

- Basic gas processing design concepts to Increase the process life span and optimize gas production
- Identification and Selection of gas processing equipment
- Gas treatment techniques and selection for optimum production
- Gas specifications, processing and production
- Gas sales agreements and contracts
- Gas measurement
- Enable accurate data collection for gas reservoir optimization
- Workshop on safe / optimum gas processing and sales
- Gas processing associated HSE issues and controls
- Component specification to cater for sand / water production and corrosive products
- Develop gas process equipment maintenance procedures and implementation plan
Course Contents
The course provides an overview of well integrity practices in the petroleum industry, including:
- General properties of natural gas
- Production from a gas reservoir
- Configuration of gas wells and their design and operation
- Manifolds and gathering systems
- Pipelines (design, flow assurance and operation)
- Gas processing schemes and technology
- Compressor configuration
- Gas Metering
- Gas Process Equipment-Policy-Standards and Procedures
- Discuss regulatory requirements for integrity assurance in gas processing plant
- Changes to equipment use and / or design (Management of Change)
- Reservoir production optimization
- Emergency Procedures
- Associated HSE issues
- Workshop exercise on gas processing plant troubleshooting
- Case Study – Gas Process Control Incident

Who Should Attend
This course is intended for the disciplines listed below, as well as anyone with a specific interest in the topic.
- Production engineers
- Production staff
- Reservoir engineers
- Maintenance personnel
- Petroleum engineers
- Other technical and operational staff

Prerequisites
None

Course Method
The course method will be a combination of the following,
- 40% Lectures
- 20% Workshops & Work Presentations
- 20% Case Studies & Practical Exercises
- 20% Videos, Software & General Discussions
### Daily Course Schedule
The course schedule will include a morning and afternoon break as appropriate during throughout the training sessions.

<table>
<thead>
<tr>
<th>Time</th>
<th>Day 1</th>
<th>Day 2</th>
<th>Day 3</th>
<th>Day 4</th>
<th>Day 5</th>
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<tbody>
<tr>
<td><strong>Morning Session</strong></td>
<td>Basic principles of fluid properties and phase behavior</td>
<td>Formation water separation and treatment</td>
<td>Pumps, compressors and valves</td>
<td>Gas Process isolations</td>
<td>Emergency Procedures</td>
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<tr>
<td>10:00 – 12:45</td>
<td>2h45 min</td>
<td>Pressure, temp, level and flow control</td>
<td>Chemical injection</td>
<td>Common Gas Processing problems and solutions</td>
<td>Workshop on gas process trouble shooting</td>
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<td><strong>Lunch</strong></td>
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<td><strong>Afternoon Session</strong></td>
<td>Choosing a Process design</td>
<td>Operation of SSV’s. Xmas trees, chokes and flowlines</td>
<td>Pumps, compressors and valves (contd.)</td>
<td>Heat exchangers, Flare and relief Systems</td>
<td>Develop Gas Plant Maintenance Plan</td>
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<tr>
<td>13:45 – 17:00</td>
<td>Gas / Liquids separation</td>
<td>Gas Process Utilities</td>
<td>Gas Plant Procedures</td>
<td>Case Histories of Incidents During Production Operations</td>
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<td>3h15min</td>
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<td>H2O removal (Glycol and</td>
<td>Sweet and Sour Gas</td>
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