Course Description:

Who is the course for?

This course is aimed at individuals in the UK oil and gas industry who are required to work with separators.

Is previous experience required?

It is expected that as a participant in this course you will have received formal training on working with hydrocarbon processing systems and that you hold suitable qualifications.

How will the course benefit me?

Separation is a common process in the oil and gas industry that is carried out so that products meet customer and environmental specifications, as well as to avoid mechanical damage. This course will provide a comprehensive overview of the principles of separation, the types of separation process used in the oil and gas industry, and the key issues that affect separation.

The knowledge gained in this course will help you work with different types of separator safely. You will learn about the various systems in place to ensure your safety and that of others.
How will the course benefit my company?

By properly understanding the different types of separation process, you can help ensure that the resulting product is to specification. You will also contribute to making your site a safer place by knowing how to work with separation equipment safely.

What standards are referenced in the course?

This course is written to current HSE guidelines, industry best practice and standard operating procedures. It also references OSPAR Recommendation 2001/1.

Is there an assessment?

Once you have completed the course, you will be asked a series of questions to check your knowledge and understanding. These are based on the learning objectives for the course and have a pass mark of 80%.

**Learning Objectives:**

• Identify the purpose of separation

• Describe the removal of corrosive and poisonous gases from reservoir fluids

• Describe reservoir fluids

• Explain how reservoir fluids are formed

• Discuss the key rock types that allow reservoir fluids to form

• Explain what is meant by the term rock porosity

• Explain what is meant by the term rock permeability

• Explain how hydrocarbon reservoirs form in (reservoir) rock traps

• Explain how rock movements contribute to the formation of hydrocarbon reservoir traps

• Describe the composition and properties of hydrocarbon reservoirs

• Explain what is meant by the term API gravity

• Explain what is meant by the term Gas to Oil Ratio

• Explain the key principles of separation

• Explain what is meant by the term water cut and how this influences the percentage of oil that is produced

• Explain how the differing physical parameters of gases, liquids and solids allow these phases to be separated from one another

• Describe the four basic separation processes that are completed using separators

• Identify the different types of separators

• Discuss what a caisson is and how it operates

• Describe what a Free-Water Knock Out Separator is and how it operates
• Describe what a tilted plate separator is and how it operates
• Describe what a slugcatcher is and how it operates
• Describe what a bubble agitator is and how it operates
• Explain what a two-phase separator is and how it operates
• Explain what a three-phase separator is and how it operates
• Describe what vertical and horizontal separators are and identify when they are used for separation
• Describe what filters are and identify when they are used for separation
• Describe what a molecular sieve vessel is and how it operates
• Describe what a heater treater is and how it operates
• Describe what a hydrocyclone is and how it operates
• Discuss the basic principles of separator design and construction
• Identify the ten basic functions of a separator
• Identify what a centrifugal separator is and how it operates
• Discuss the importance of achieving a state of equilibrium for multi-stage separation
• Describe how to achieve equilibrium for multi-stage separation
• Identify the design constraints associated with designing separators
• Discuss the need for control in the separation process
• Describe the key components of a control loop
• Identify the four process control parameters that operate in a separator system
• Identify how pressure is monitored and controlled
• Identify how levels are monitored and controlled
• Identify how flow is monitored and controlled
• Identify how temperature is monitored and controlled
• Identify the purpose of alarms in control instrumentation
• Discuss the principles of separator shutdown
• Discuss the effects of unit and process shutdowns on separator shutdown
• Identify the importance of providing and following company procedures for separation
• Outline the separator start up procedure
• Describe start up through a test separator
• Describe start up after a short term shutdown
• Describe the main problems that can occur during the separation process
• Describe what is meant by the term carry over and identify the main causes of carry over
• Describe what is meant by the term oil in the gas stream and identify the main causes of this type of carry over
• Describe what is meant by the term gas break through and identify the main causes of gas break through
• Identify the main causes and consequences of produced water in the oil stream
• Identify the main causes and consequences of oil in the water stream
• Identify the purpose of maintenance override switches (MOR) in separators
• Describe the main causes and effects of blockages in the separator inlet or outlet streams
• Identify how emulsions form, stabilise and affect the separation process
• Identify how froth and foam form, stabilise and affect the separation process
• Identify that slug formation can affect the separation process
• Identify how slugs form and affect the separation process
• Identify the key functions of the slugcatcher
• Explain how a typical slugcatcher is constructed and operated
• Explain what hydrates are, how they form and affect the separation process
• Identify the key technological advances in extracting oil and gas
• Identify new subsea and downhole separation technologies
• Identify what a twister supersonic separator is and how it operates
• Discuss the disposal of and new uses for produced water