SURFACE TREATMENT AND STORAGE

INSTITUTE FOR PROFESSIONAL AND EXECUTIVE DEVELOPMENT

United Kingdom

UNIT SPECIFICATION

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Unit Title

Surface Treatment and Storage

Credit value

The credit value for this unit is 30 30 credits equivalent to 300 hours of teaching and learning (10 hours is equivalent to 1 credit) Guided learning hours (GLH) = 50 hours GLH includes lectures, tutorials and supervised study. This may vary to suit the needs and requirements of the learner and/or the approved centre of study. Directed learning = 50 hours: This includes advance reading and preparation, group study, and undertaking research tasks. Self-managed learning = 200 hours: This includes completing assignments and working through the core and additional reading texts. It also includes personal research reading via other physical and/or electronic resources.

Learning outcome Learner will:	**Assessment criteria** Learner can:
1.0 Understand the features and use of flowlines	1.1 Describe the features of a flowline 1.1.1 Describe the functions of the following: - Radial gathering system - Axial gathering system - Headers - Central processing unit - Valves 1.2 Examine the function of flowlines 1.3 Explain why the formation of hydrates are undesirable in a flowline
2.0 Understand the features and uses of separators	2.1 Give an account on how oil, gas and water are separated 2.2 Describe the features of a separator 2.2.1 Examine the following types of separators: - Vertical and horizontal separators - Two-phase and three-phase separators 2.2.2 Examine the advantages and disadvantages of vertical and horizontal separators 2.2.3 Describe the functions of a free water knock out (FWKO) 2.3 Examine the features and functions of a heater treater 2.4 Explain what is meant by retention time as used in the process of separation
3.0 Understand how gas is treated, tested and measured	3.1 Differentiate between transportable gas and sales-quality or pipeline gas

	3.2 Critically examine the characteristics of pipeline-quality gas 3.3 Explain what is meant by gas conditioning and stripping 3.4 Discuss why inert and acid gases (H2S and CO2) are removed from natural gas. 3.5 Examine the processes used to remove H2S and CO2 from natural gas: - Batch process - Amine process 3.6 Discuss how the formation of hydrates with natural gas can be controlled or remedied 3.7 Examine how water vapour can be removed from natural gas to obtain the required degree of dryness: - By treating the gas in a glycol treater - By treating the gas in a desiccant - By using an adsorption system 3.8 Examine the use of compressors 3.8.1 Describe the features of the following types of compressors - Positive displacement compressor - Centrifugal compressor - Multi stage compressor 3.9 Explain the following tests performed on natural gas - Compression tests - Charcoal test - Fractional analysis 3.10 Describe how gas flow/volume is measured: - Using orifice meters - Using turbine meters

4.0 Understand how produced water is disposed of both onshore and offshore	4.1 Discuss why water produced during separation must be treated before being injected into a subsurface formation for disposal or as part of an enhanced oil recovery (EOR) project 4.2 Discuss how the following can be removed from produced water: - Suspended solids - Suspended oil - Scale particles - Bacteriological matter - Corrosive gases 4.3 Describe how produced water can be disposed of onshore and offshore (where a reinjection well may be too expensive to drill)
5.0 Understand how oil is treated, stored and measured	5.1 Explain what is meant by basic sediment and water (BS&W) content of oil and identify what percentage of BS&W of oil will be accepted by a refinery or pipeline 5.2 Explain what is meant by a shake-out test and analyse its relevance 5.3 Evaluate the methods that can be used to break oil-water emulsions: - By increasing the settling time to allow the droplets to fall out of their own accord - By heating the emulsion - By applying electricity - By adding demulsifying chemicals 5.4 Examine the use of stock tanks for storing oil 5.4.1 Differentiate between bolted steel tanks and welded steel tanks 5.4.2 Evaluate the importance of a vapour recovery system in a stock tank

	5.5 Describe how stored oil is measured by a gauger 5.6 Examine how oil is measured using a: - Positive displacement (PD) meter - Turbine meter 5.7 Describe the use of a lease automatic custody transfer (LACT) unit 5.8 Describe how oil is measured where it is to be transported onshore from the stock tank (from the seller) to the buyer using both a tank truck and a LACT. 5.9 Examine how oil produced offshore is measured.

Recommended learning resources

Indicative reading	Hydrocarbon exploration and production by Graham et al (2008). ISBN: 978-0444532367 • For a full list of textbooks and publications relevant to this unit, please contact IPED - UK.
Learning Aid	A learning resource material is provided to guide the learner/tutor and to serve as a quick reference point for contents of the programme. The student is advised not to be over reliant on the study guide but to access the relevant textbooks or other academic materials as much as possible to help him/her with the course.