

Oil and Gas Production II

Session Objectives

SESSION	TOPIC	OBJECTIVES
1	Course Overview	<ol style="list-style-type: none"> 1. Review the major topics covered in Oil and Gas Production I 2. Review the major topics to be covered in Oil and Gas Production II.
2	Introduction to Gas Dehydration and Compression	<ol style="list-style-type: none"> 1. Provide an overview of the role and importance of gas in the oil and gas industry. 2. Discuss the composition and physical properties of natural gas. 3. Review terms associated with gases and the properties of gases. 4. Recall the ideal gas laws. 5. Provide a review of the topics to be covered in the next three sessions devoted to gas treatment, hydration, and compression 6. Describe the various techniques used to treat natural gas: <ul style="list-style-type: none"> – Separation – Dehydration – Miscellaneous gas conditioning techniques

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3	Gas Dehydration – Part 1	<ol style="list-style-type: none"> 1. Discuss the concept of dew point, specifically hydrocarbon dew point vs. water dew point. 2. Explain the formation of hydrates and how hydrates affect natural gas. 3. Identify methods used to prevent the formation of hydrates: <ul style="list-style-type: none"> – Heat treatment – Dehydration 4. Differentiate between liquid and solid desiccant dehydrators. 5. Identify the major components of the solid dehydration process: <ul style="list-style-type: none"> – Adsorption towers – High temperature heater – Regeneration gas cooler – Regeneration gas separator 6. Describe the purpose, construction and operation of each piece of solid dehydration equipment. 7. Identify the major components of the liquid desiccant dehydration process: <ul style="list-style-type: none"> – Glycol absorber (contactor) – Glycol pump – Glycol strainers (wet and dry) – Glycol surge tank – Glycol exchanger – Glycol reboiler – Stripper – Reflux condenser

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4	Gas Dehydration – Part 2	<ol style="list-style-type: none"> 1. Describe the activities associated with monitoring and regulating the dehydration process. 2. Describe the activities associated with maintaining dehydration process performance. 3. Describe the dehydration process maintenance activities performed by the production technician. 4. Explain the typical malfunctions associated with dehydration systems. 5. Discuss the safety systems associated with the dehydration process. 6. Describe the safety, health and environmental concerns associated with working with dehydration process. 7. Compare and contrast the major differences in dehydration systems between onshore and offshore facilities, as well as between various regions within the United States.
5	Gas Compression – Part 1	<ol style="list-style-type: none"> 1. Discuss the purpose of the compressor system in gas treatment. 2. Discuss the various types of compressors used in gas treatment: <ul style="list-style-type: none"> – Reciprocating compressors – Turbine driven centrifugal compressors 3. Review the purpose, construction and operation of the various types of compressors used in gas treatment. 4. Describe the activities associated with monitoring and regulating the compression process. 5. Describe the activities associated with maintaining compression process performance.
6	Gas Compression – Part 2	<ol style="list-style-type: none"> 1. Discuss the various types of compressors used in gas treatment: <ul style="list-style-type: none"> – Reciprocating compressors – Turbine driven centrifugal compressors 2. Review the purpose, construction and operation of the various types of compressors used in gas treatment. 3. Describe the activities associated with monitoring and regulating the compression process. 4. Describe the activities associated with maintaining compression process performance.

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7	Gas Compression – Part 3	<ol style="list-style-type: none"> 1. Describe the activities associated with maintaining compression process performance. 2. Discuss the safety systems associated with the compression process. 3. List operating conditions that would warrant a manual or emergency shutdown of a gas compressor. 4. Describe the production technician’s emergency response to a gas leak, fire, etc. in a compressor unit. 5. Describe the compression process maintenance activities performed by the production technician. 6. Describe the safety, health and environmental concerns associated with working with compression process. 7. Explain the typical malfunctions associated with compression systems. 8. Compare and contrast the major differences in compression systems between onshore and offshore facilities, as well as between various regions within the United States. 9. Given a computer simulator, pilot plant or tabletop unit, operate and troubleshoot a gas treatment and compression system.

SESSION	TOPIC	OBJECTIVES
8	Water Treatment and Handling	<ol style="list-style-type: none"> 1. Discuss the purpose of produced water treatment systems. 2. Describe the various techniques used to treat and/or dispose of produced water onshore and offshore. 3. Identify the major components of the produced water treatment system: <ul style="list-style-type: none"> – Skimmers – Clarifiers – Water cyclones – Flotation cells – Chemicals 4. Describe the purpose, design and operation of each piece of produced water treatment equipment. 5. Describe the activities associated with monitoring and regulating the produced water treatment process. 6. Describe the activities associated with maintaining produced water treatment process performance. 7. Describe the various sampling procedures and tests used during produced water treatment. 8. Describe the produced water treatment process maintenance activities performed by the production technician. 9. Describe the safety, health and environmental concerns associated with working with produced water treatment process. 10. Discuss the safety systems associated with the produced water treatment process. 11. Explain the typical malfunctions associated with produced water treatment systems. 12. Compare and contrast the major differences in produced water treatment systems between onshore and offshore facilities, as well as between various regions within the United States. 13. Given a computer simulator, pilot plant or tabletop unit, operate and troubleshoot a produced water treatment system.

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9	Auxiliary Systems— Part 1	<ol style="list-style-type: none"> 1. Discuss the role of the instrument air system at a production facility, including its operation and maintenance by production technicians. 2. Discuss the role of the flare and relief system at a production facility, including its operation and maintenance by production technicians. 3. Discuss the role of the fuel gas system at a production facility, including its operation and maintenance by production technicians. 4. Discuss the role of the electrical distribution system at a production facility, including its operation and maintenance by production technicians.
10	Auxiliary Systems— Part 2	<ol style="list-style-type: none"> 1. Discuss the way in which of the following auxiliary systems support the production facility: <ul style="list-style-type: none"> – Crane and winch – Heating and ventilation – Fire fighting and life saving equipment – SCADA (Supervisory Control and Data Acquisition) – LACT (Lease Automatic Custody Transfer) Unit 2. Discuss pigging operations: <ul style="list-style-type: none"> – Pig types: cleaning, displacement, smart pigs (for corrosion monitoring) – Launching and receiving – Safety and hazards 3. Discuss the production technician's role in the operation and maintenance of the auxiliary systems.

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11	Artificial Lift and Enhanced Recovery Techniques— Part 1; Review for Test #3	<ol style="list-style-type: none"> 1. Discuss different artificial methods and equipment available for lifting hydrocarbons. 2. Explain the purpose of artificial lift and enhanced recovery techniques. 3. Provide an overview of the different artificial methods and equipment available for lifting hydrocarbons. 4. Describe the process of and equipment involved in beam pumping. 5. Describe the process of and equipment involved in subsurface hydraulic pumping. 6. Describe the process of and equipment involved in electric submersible pumping. 7. Describe the process of and equipment involved in gas lift.
12	Test # 3; Artificial Lift and Enhanced Recovery Techniques— Part 2	<ol style="list-style-type: none"> 1. Describe the process of and equipment involved in water flooding. 2. Describe the process of and equipment involved in gas injection processes. 3. Describe the process of and equipment involved in chemical recovery processes. 4. Describe the process of and equipment involved in thermal recovery processes. 5. Compare and contrast the major differences associated with artificial lift and enhanced recovery techniques between onshore and offshore facilities, as well as between various regions within the United States.
13	Pumping and Transportation Systems	<ol style="list-style-type: none"> 1. Identify the early methods used to transport crude oil, natural gas and petroleum products. 2. Discuss the current methods used to transport crude oil, natural gas and petroleum products. 3. Compare and contrast the methods and materials used to construct pipelines on land and offshore. 4. Discuss the economic and safety issues surrounding the transportation of crude oil, natural gas and petroleum products.

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14	Safety, Health and Environmental Considerations	<ol style="list-style-type: none"> 1. Discuss the Minerals Management Service (MMS) regulations that govern oil and gas production operations. 2. Discuss the United States Coast Guard (USCG) regulations that govern oil and gas production operations. 3. Discuss the American Petroleum Institute (API) regulations that govern oil and gas production operations. 4. Discuss the Department of Transportation (DOT) regulations that govern oil and gas production operations. 5. Discuss the Occupational Safety and Health Administration (OSHA) regulations that govern oil and gas production operations. 6. Discuss the Environmental Protection Agency (EPA) regulations that govern oil and gas production operations. 7. Discuss the state and regional environmental regulations that govern oil and gas production operations. 8. Discuss issues surrounding rigging and crane operation. 9. Discuss issues surrounding helicopter safety. 10. Discuss issues surrounding boat safety. 11. Discuss issues surrounding hazardous and non-hazardous waste disposal. 12. Describe the production technician's role in complying with regulations and standards.
15	Crude Oil Refining and Gas Processing; Review for Test #4	<ol style="list-style-type: none"> 1. Recall the structure of hydrocarbons found in oil and gas. 2. Outline the process and products from refining. 3. Outline the process and products from natural gas production. 4. List some major petrochemicals that can be derived from petroleum. 5. Explain the relationship between efficient oil and gas production to efficient crude oil refining, natural gas processing and petrochemical processing.
16	Test #4	No new objectives are presented in this session.