COURSE TITLE: GAS TREATMENT & SUPHUR RECOVERY

Course Duration: 4 days Classroom course

Course Level: Foundation / Intermediate

Overview of Course:

There are many processes available for treating natural gas to remove acid gas components and other contaminants. Many of the processes are proprietary and this course will cover aspects of common solvent and non-solvent based processes as well as features of a number of proprietary processes. The course will also cover sulphur recovery and tail gas treating. This course will take the participants through the different types of processes, describing how each functions and look at the strengths and weaknesses of each process.

DESIGNED FOR YOU, IF YOU ARE...

- A Process or Facilities Engineer, either a Graduate or a more experienced Technical Professional looking to develop an understanding of the processes available for removal of contaminants from natural gas.
- A Project Manager who seeks greater understanding of the various process available for treating natural gas including proprietary processes
- An Operations Engineer looking to deepen your knowledge of the design principles and performance of gas treating plants
- Anyone looking to gain more information on advantages and disadvantages of the different gas treating technologies and some of the operational issues associated with them.

HOW WE BUILD YOUR CONFIDENCE

This course will take the participant step by step through the many gas treating processes. It teaches the fundamentals of each process providing pros and cons of the processes and operating experiences. The course is highly interactive and participants are encouraged to share their own experiences and problems to the benefit of all.

THE BENEFITS FROM ATTENDING

By the end of the course you will have gained insight and understanding of how to select suitable gas treating process to remove unwanted contaminants in natural gas. You will understand the important criteria in selecting the best process for a particular natural gas according to the product specification required. You will have gained this from seasoned professionals who have been involved directly with the processes and have real life experiences to offer not just textbook knowledge.

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TOPICS

- Primary Gas Production Systems
- Gas Contaminants
- Liquid Absorption Processes (Amines, Hot Potassium Carbonate, Physical Solvents, Hybrid (Mixed) Solvents) for acid gases and sulphur compounds
- Solid Bed Processes,
- Membranes
- Scavengers
- Redox Processes
- Liquid Sweetening
- Removal of other contaminants
- Sulphur Recovery Processes
- Tail Gas Treating
- Operational Problems in Sour Gas Treating

DAILY AGENDA

Day 1: Properties of Reservoir Gas & Primary Gas Processing

Properties of Reservoir Gas

- Properties of Natural Gas
    - Reservoir Fluids & Phase Envelopes
- Associated & Non-Associated Gas Reservoirs
    - Hydrocarbon & non-hydrocarbon compositions
    - Reservoir Souring
    - Other Gas Sources
    - Water Content of Gas

Primary Gas Production & Processing

- Primary Separation

Exercise 1 : Primary Production – 1st Stage Separator Conditions

- Hydrocarbon & Water Dew-Pointing
- Overview of Gas Dehydration
    - Introduction to Hydrates
    - Cooling, Expansion & Refrigeration
    - TEG Dehydration
    - Adsorption Dehydration

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Exercise 2 : Mol Sieve Dehydration

- Membrane Dehydration

Day 2: CO_2 and H_2S Removal

Contaminants in Natural Gas

- Naturally Occurring Contaminants
- Gas Product Specifications

Introduction to Gas Treating for CO_2 & H_2S Removal

Solvent Processes

- Chemical Solvents
  - Amine Processes
  - Hot Potassium Carbonate
- Physical Solvents
- Hybrid Solvents
- Solvent Selection
  - Solvent Selectivity

Exercise 3 : Solvent Selection for Sour Gas

Membranes Separation

- Types of Membranes
- Membrane Flow Schemes

Cryogenic CO_2 Separation

- Ryan Holmes
- CFZ

Day 3: Gas and Liquid Sweetening & Other Contaminants Removal

Other H_2S Removal Processes

- Solid Bed Processes
- Scavenger Processes

Process Summaries for CO_2 and Sulphur Removal

Solvent Circulation Rates

- Process Flow Schemes
- Solvent Circulation Rate Calculations

Exercise 4 : Solvent Circulation Estimation

Operational Problems in Solvent Processes

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Liquid Sweetening

- Contaminants split between Gas and Liquid
- Liquid Product Specifications
- Caustic Wash Processes
    - Merox® Process
- Amine Treatment Processes
- Solid Bed & Other Processes

Other Contaminant Removals

- Mercury Removal
- BTEX Removal
- Oxygen Removal
- Nitrogen Removal
- NORM

Exercise 5 : Planning a Treatment Process

Day 4: Sulphur Recovery

Sulphur Recovery

- Sulphur Specifications
- Basic Claus Process
- Modified Claus Processes
- Redox Processes
- Other Sulphur Processes

Tail Gas Treating

Exercise 6 : Sulphur Recovery Process Scheme

Operational Problems in Sulphur Production Processes

Computer Simulation

Course Wrap Up

INSTRUCTOR:

Phil Tudhope is currently Director of a consulting company, specialising in technical and project management training for graduates and more senior technical staff. He has a first-class honours B.Sc. in Mechanical Engineering from Bristol University and is a Chartered Engineer, Fellow of the Institution of Mechanical Engineers and Associate Member of the Institution of Chemical Engineers.

Phil has over 40 years' experience in Project Management, Technical Development and Change Management in the oil & gas industry and proven technical and managerial capabilities to achieve results with a strong business focus and to effect significant positive change. He is a specialist in

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front-end (feasibility & concept selection) phases of upstream oil & gas developments with midstream (LNG) experience and project execution experience and has the ability to perform analysis and development work as well as lead and motivate teams.

Amongst other roles, he was Specialist Front End Advisor at Petronas Carigali, Chief Process Engineer at BG Group and Head of Upstream Engineering at Shell Technology India. He has experience worldwide in differing political, social and remote environments, having worked overseas for 28 years including the Far East, USA, Europe, the Middle East and India.

Phil is an experienced instructor including the development and delivery of technical and project management courses.

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