Gas Processing and Conditioning: Amine Sweetening, Sulphur Recovery and NGL Extraction

10 – 14 October 2027
Jeddah - Corniche four-star



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Introduction:

Gas processing and conditioning plants lose sales gas, sulphur and liquids revenue through avoidable upsets: a foaming amine absorber that lets H2S slip, a Claus furnace run on the wrong air-to-acid-gas ratio, wet gas that freezes in the cold box or a turboexpander trip that pushes hydrocarbon dew point off specification. This Core Concept course takes operators and engineers unit by unit through inlet receiving, amine sweetening, dehydration, sulphur recovery, NGL extraction and fractionation, with operating targets for each. Participants work through plant data cases and produce a Gas Plant Unit Health Check and Troubleshooting Register.

Course Objectives:

- Interpret raw gas analyses and sales gas specifications and trace each contaminant to the gas plant unit that removes it
- Select an amine solvent and set strength, circulation rate and loading targets for H2S and CO2 removal
- Operate amine absorbers and regenerators, glycol contactors and molecular sieve beds to hold treated gas on specification
- Run the Claus reaction furnace, catalytic converters and tail gas handling to keep sulphur recovery and stack emissions on target
- Control hydrocarbon dew point and NGL recovery with JT, refrigeration and turboexpander schemes and follow product streams through the fractionation train
- Diagnose foaming, amine losses, off-specification gas and recovery drops from plant data and compile a Gas Plant Unit Health Check and Troubleshooting Register

Target Audience:

- Gas plant shift operators and control room technicians who run inlet, amine, dehydration and NGL units
- Shift supervisors responsible for sales gas quality, unit line-ups and handover between crews
- Process engineers responsible for gas plant unit performance, test runs and troubleshooting
- Sulphur recovery operators and engineers responsible for Claus trains, incinerators and tail gas units
- Laboratory and analyser staff who test amine, glycol, sulphur and NGL product samples
- Technical support staff moving into gas processing from upstream production or refining assets

Course Outline:

Day 1: Feed Gas Composition, Sales Gas Specifications and Inlet Receiving

- Raw Gas Composition Analysis: Methane, Ethane Plus, H2S, CO2, Mercaptans and Inerts
- Sales Gas Specifications: Heating Value, H2S Limit, Water Content and Hydrocarbon Dew Point
- Gas Plant Block Flow Diagram from Inlet Receiving to Residue Gas and NGL Product Meters
- Slug Catcher and Inlet Filter Coalescer Duty: Liquid Surge Volume and Carryover Protection
- NGL Fractionation Train Overview: Deethaniser, Depropaniser and Debutaniser Product Streams

Day 2: Acid Gas Removal Chemistry and Amine Solvent Selection

- Acid Gas Removal Options: Chemical Amine Solvents, Physical Solvents and Polymeric Membranes
- MEA, DEA, DGA, DIPA and MDEA Reaction Behaviour and Selective H2S Removal with MDEA
- Formulated and Activated MDEA Blends for Controlled CO2 Slip
- Amine Strength, Lean Loading and Rich Loading Limits for Corrosion Control
- Amine Unit Flow Scheme: Contactor, Rich Amine Flash Drum, Lean-Rich Exchanger, Stripper and Reboiler

Day 3: Sweetening, Dehydration and NGL Recovery Unit Operation

- Amine Absorber Running: Lean Amine Temperature Approach, Circulation Rate and Tray Differential Pressure
- Amine Stripper Running: Reboiler Steam Rate, Reflux and Lean Amine Quality Checks
- Hydrate Margin and TEG Contactor, Stripping Gas and Lean Glycol Purity Control
- Molecular Sieve Bed Adsorption and Regeneration Cycle with Mercury Guard Beds Ahead of the Cold Box
- Hydrocarbon Dew Point and NGL Recovery by JT Valve, Propane Chiller and Turboexpander Schemes

Day 4: Amine Upsets, Claus Sulphur Recovery and Tail Gas Handling

- Amine Foaming Diagnosis: Foam Height Test, Antifoam Injection and Carbon Bed Filtration
- Heat Stable Salts, Degradation Products and Amine Loss Accounting by Vaporisation, Entrainment and Leaks
- Claus Reaction Furnace: Air-to-Acid-Gas Ratio and One-Third H2S Combustion to SO2
- Claus Catalytic Converters on Alumina or Titania: Reheat Temperatures, Sulphur Condensers and Dew Point Margin
- Tail Gas Treatment Unit and Thermal Incinerator Operation with Stack Emission Checks

Day 5: Gas Plant Troubleshooting Cases and the Unit Health Check Register

- Gas Plant KPI Set: Off-Specification Hours, Amine Loss Rate, Sulphur Recovery Efficiency and NGL Recovery
- Case Study: Treated Gas H2S Excursion Traced Through Contactor and Stripper Data
- Case Study: Claus Train Recovery Drop and Tail Gas H2S to SO2 Ratio Drift
- Case Study: Rising Hydrocarbon Dew Point After a Turboexpander Trip
- Gas Plant Unit Health Check and Troubleshooting Register Drafting and Peer Review

Skills You Will Gain:

- Gas Composition Interpretation
- Amine Solvent Selection
- Contactor and Stripper Control
- Foam and Heat Stable Salt Management
- Claus Air Ratio Control
- Glycol and Molecular Sieve Dehydration
- Dew Point and NGL Recovery Control
- Gas Plant Performance Monitoring

Why Attend This Course:

- Return with a Gas Plant Unit Health Check and Troubleshooting Register built from case data on amine, sulphur and NGL units
- Catch foaming, heat stable salt build-up and amine losses before treated gas goes off specification
- Keep Claus trains close to design recovery by reading air ratio, converter temperatures and tail gas trends together
- Compare gas plant practice with operators and engineers from sour gas, associated gas and non-associated gas facilities

Conclusion:

A gas plant stays on specification when every unit runs to clear targets and upsets are traced to their source quickly. The course moves from feed gas composition, sales gas specifications and inlet receiving, through amine chemistry and solvent selection, to contactor, stripper, dehydration and NGL recovery operation, then to foaming, amine losses, Claus sulphur recovery and tail gas handling. The final day applies this material to plant data cases and produces a Gas Plant Unit Health Check and Troubleshooting Register for each participant's own facility.